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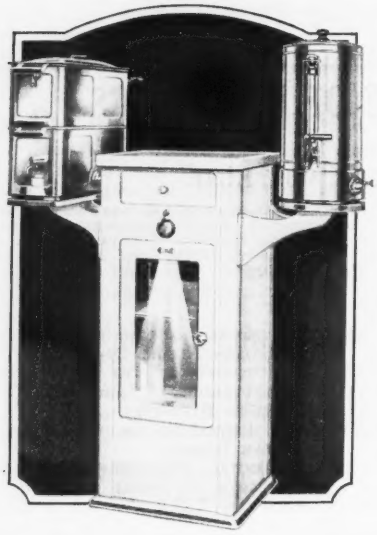

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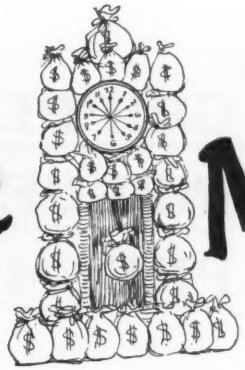

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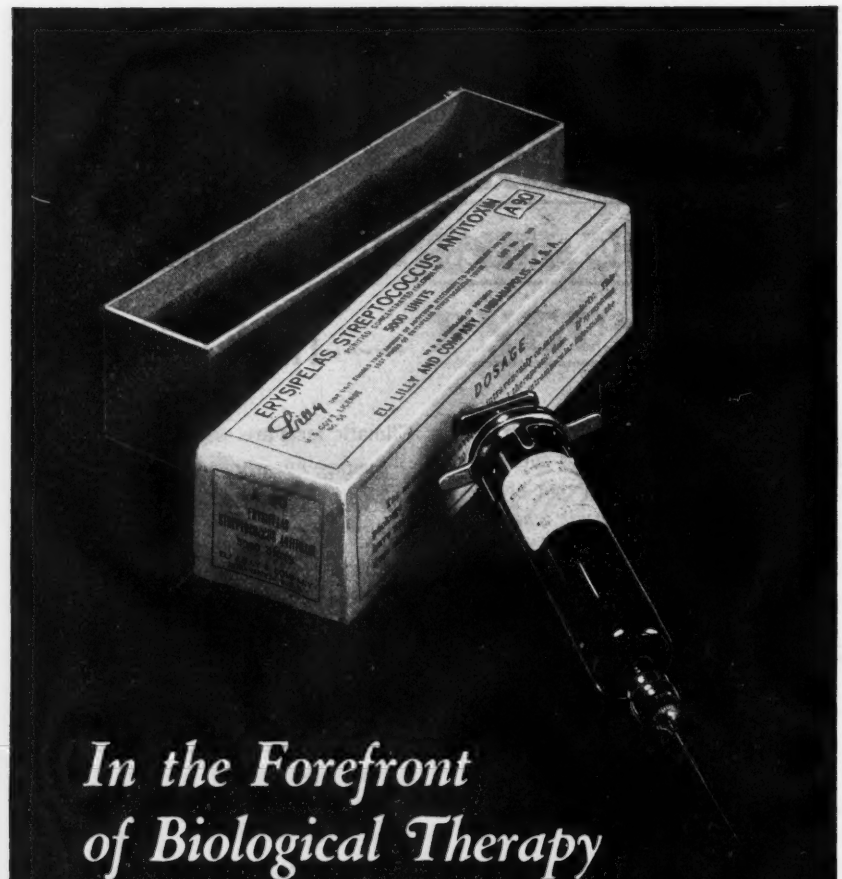

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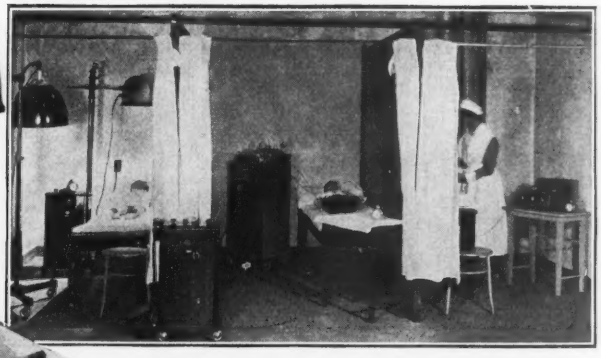

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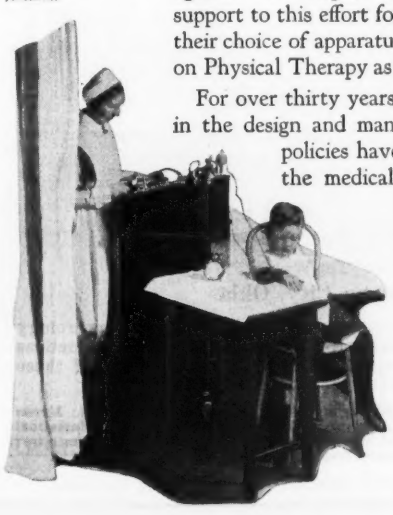

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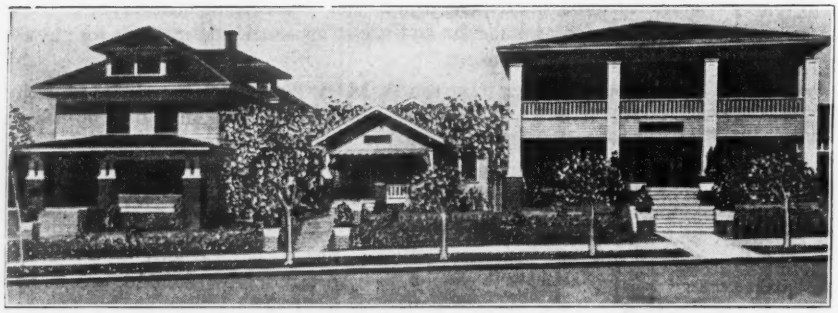

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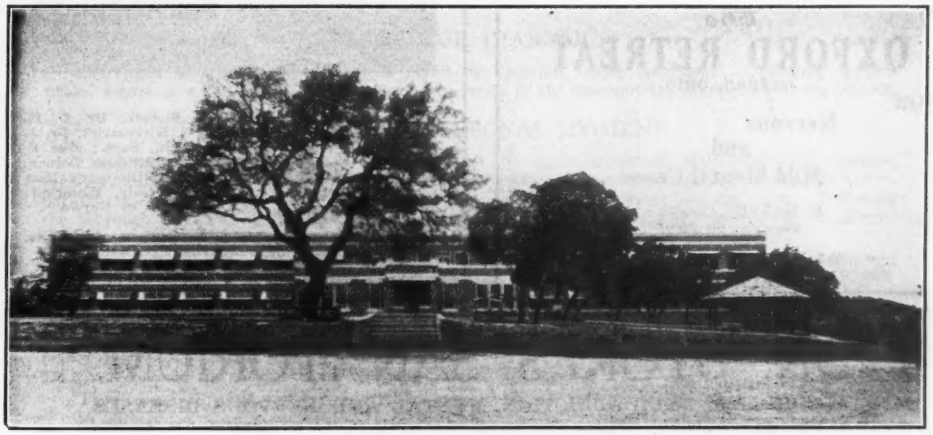

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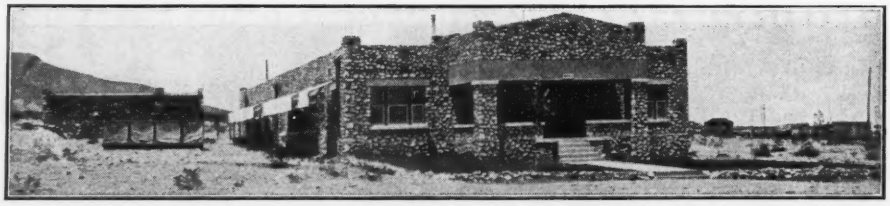

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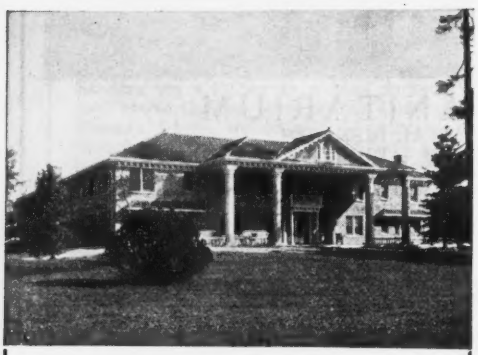

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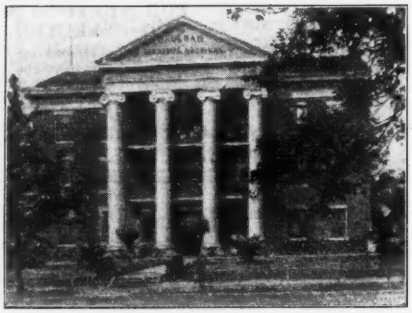

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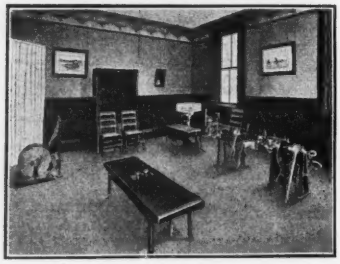

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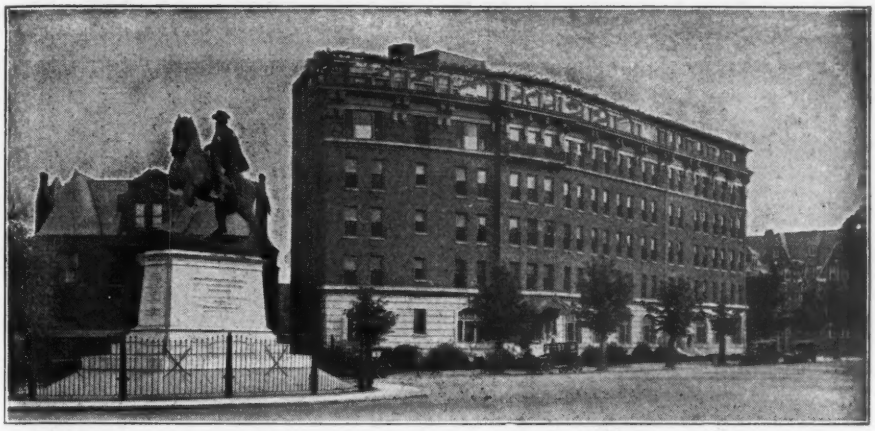

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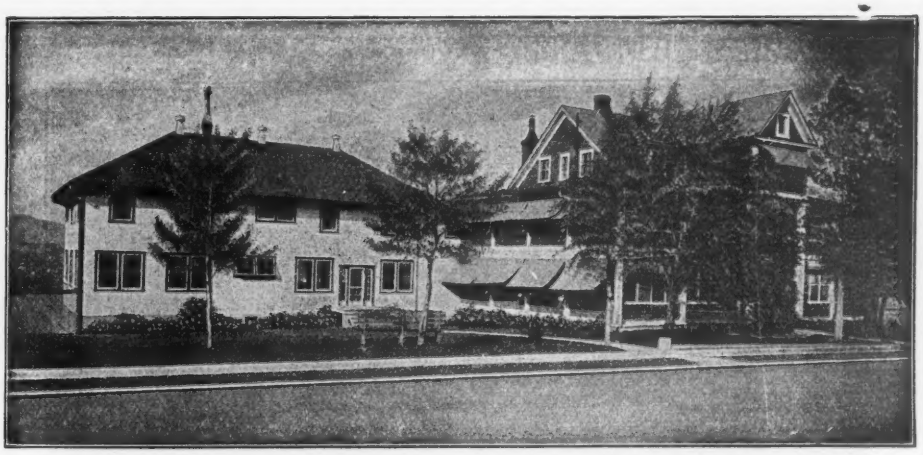

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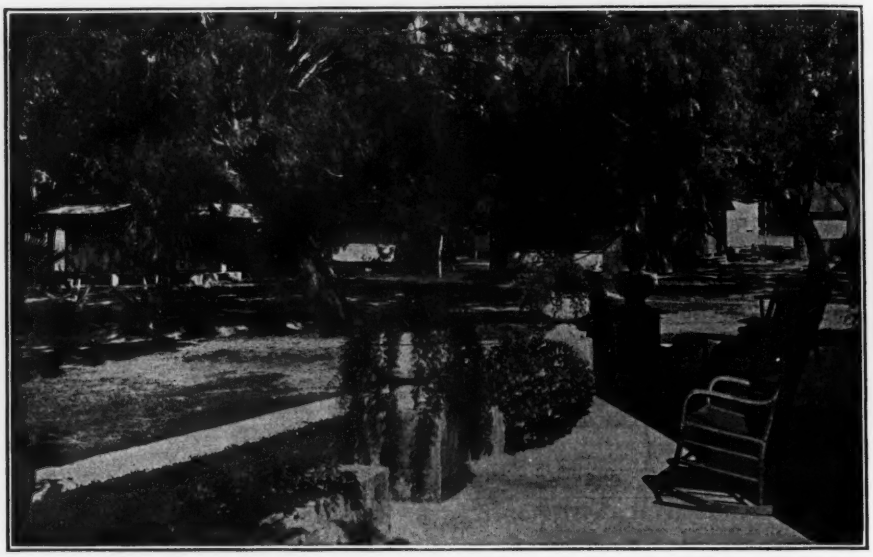

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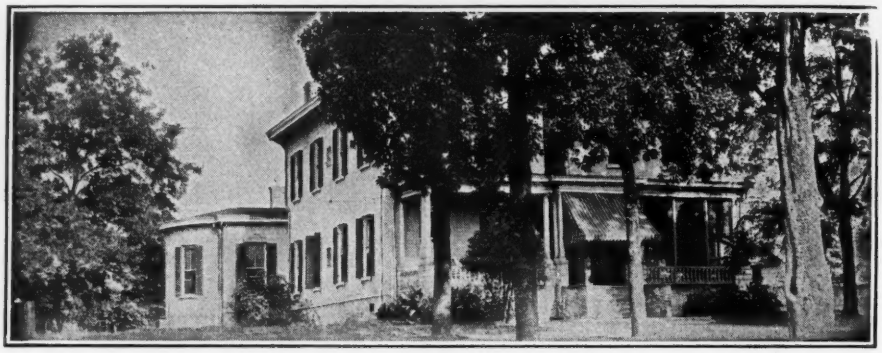

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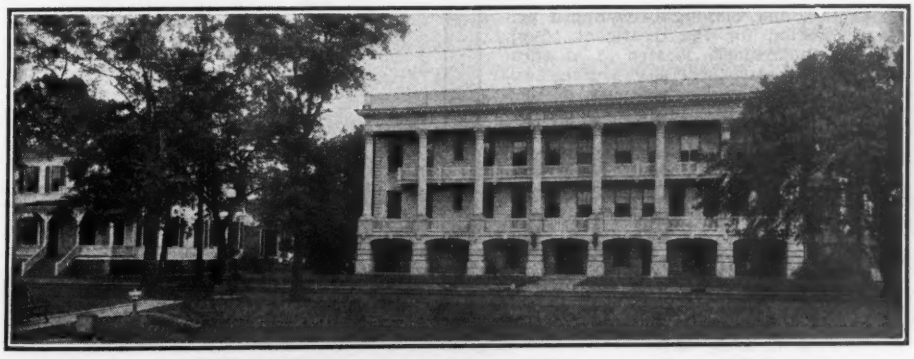

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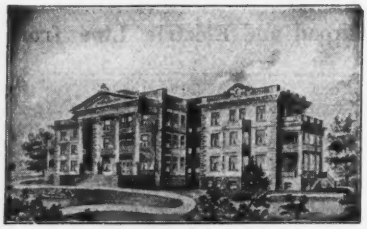

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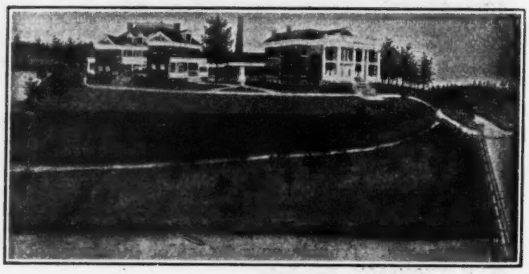

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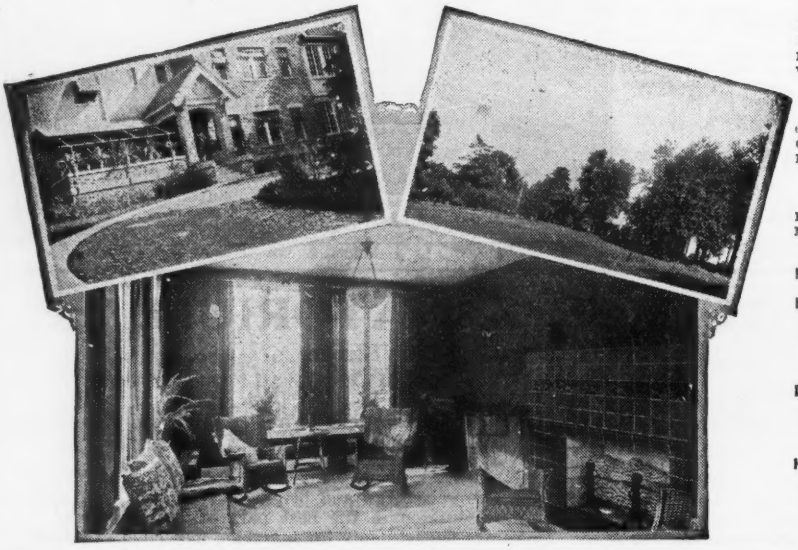

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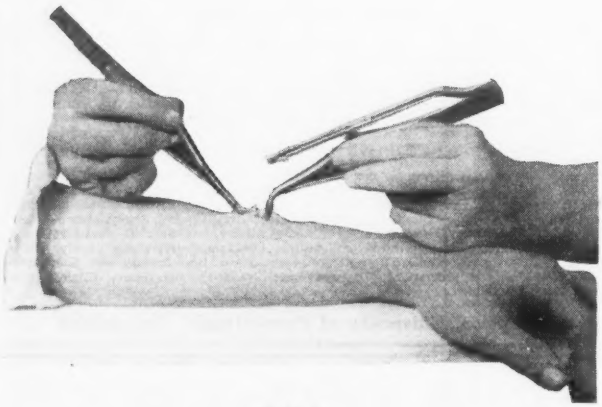

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POLLEN PROTEINS AND THEIR CLINICAL SIGNIFICANCE IN HAY FEVER. A PRELIMINARY COMMUNICATION*†

By HARRY S. BERNTON,[1] M.D.,
D. BREESE JONES,[2] PH.D.,
and
FRANK A. CSONKA,[3] PH.D.,
Washington, D. C.

In the history of hay fever, three dates mark important contributions to the knowledge of the disease. In 1865, Blackley[1] first proved that the pollen of the grasses was responsible for the English type of hay fever. In 1903, thirty-eight years later, Dunbar,[2] who had accepted the English view concerning the pollen origin of hay fever, demonstrated that the protein constituent of the pollen grain was the toxic agent. Dunbar's work established the foundation for subsequent investigations. In 1911, forty-six years after Blackley's epochal discovery, Noon and Freeman[3] devised the method of preventive treatment of hay fever, which is in vogue at the present time. The treatment consists in desensitizing the patient with a solution of the protein, prepared from the offending pollen.

Various measures have been employed for the preparation of protein from the pollen. Noon and Freeman obtained a solution of protein by alternately freezing and thawing the pollen in distilled water. After filtration, the aqueous extract was boiled for ten minutes in sealed tubes. Clowes[4] first defatted the pollen with acetone, then extracted with distilled water. Lowdermilk[5] substituted physiologic sodium chlorid solution for distilled water. Clock,[6] however, recommended as a solvent a fluid consisting of 33.33 per cent saturated sodium chlorid and 66.66 per cent glycerol. Koessler[7] extracted the pollen with an 8.5 per cent sodium chlorid solution, and then diluted the extract with 10 volumes of sterile water, whereby the sodium chlorid concentration was converted to that of a physiological salt solution. Addition of 10 volumes of 95 per cent alcohol to this saline extract precipitated a yellowish-white powder. This product in a dilution of 1 to 100,000 produced a typical reaction when introduced into the conjunctiva.

Goodale[8] soaked the grains in water for a few hours and added alcohol sufficient to make a dilution of from 13 to 15 per cent by volume. Walker[9] preferred a 12 per cent alcoholic saline solution. Rackemann[10] employed a physiologic sodium chlorid solution made slightly alkaline by addition of 1 per cent normal sodium hydroxid. Coca[11] similarly employed an alkaline extracting medium consisting of sodium chlorid and sodium bicarbonate in such concentration that 10 c.c. of the final fluid was equivalent to about 3 c.c. of tenth normal alkali. One of us (Bernton) modified Coca's method by the addition of two parts of glycerol to one part of Coca's fluid. According to the observations of Armstrong and Harrison,[12] the method yields a "stable, potent, specific bacteria-resisting" product.

The great diversity in methods of preparation of pollen extracts, and therefore of pollen protein, has inevitably led to a diversity in therapeutic results. However, in the critical analysis of the results of hay fever therapy, which after all is the chief concern of physician and patient, the causes of failure assume a commanding in-

*Read in Section on Medicine, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

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3. Associate Chemist, Protein Investigation Laboratory, Bureau of Chemistry, United States Department of Agriculture.

terest. Rackemann[13] has collected the data of four large hay fever clinics and records the percentage of poor therapeutic results. These vary from 23 to 36 per cent. Nevertheless, in the same clinics, identical treatment of late hay fever has yielded perfect results in 10 to 25 per cent of the patients. No explanation has been offered for failure in such a large group of victims.

"It is evident," Rackemann[14] believes, "that success in the treatment demands a course of doses of a size and extent which is optimal for the particular patient. What this means, so far as the underlying mechanism of hay fever is concerned, is a problem, the solving of which must wait upon the collection of data of another kind."

The isolation of proteins from timothy, orchard grass and the short ragweed, and the study of their relationship to hay fever seem to aid in the solution of this important problem. Our present communication is concerned with the results of this study.

Curiously enough, the chemical composition of grass pollens has received scant attention. In 1904, Kammann,[15] a pupil of Dunbar, published the first chemical analysis of rye pollen, which is the most important cause of hay fever in Germany. Kammann's conclusion that the albumin of the pollen grain is the toxic fraction is, indeed, significant. According to the method of extraction employed by the author, it is likely that he was dealing with a mixture of proteose and albumin. No mention of proteose as such is made, nor is the clinical evidence cited upon which the toxicity of the albumin fraction is based.

In 1925, Caulfield[16] made passing reference to the protein fractions of timothy grass in his report on "Skin Tests on Hay Fever Cases with (Chemically) Different Fractions from Ragweed Pollen." This report appeared simultaneously with ours on the isolation of the proteins of timothy and orchard grass.[17] Caulfield states:

"From the few cases of hay fever positive to timothy grass, which have been tested with similar fractions of timothy pollen, varying results have been obtained as with the ragweed cases."

In a later publication (August, 1926) Caulfield and his associates, Cohen and Eadie,[18] make the following report under the caption, "Chemistry of Timothy Pollen:"

"A small amount of timothy was extracted in the same way as the birch, the saline extraction being omitted. No analysis was made of the nitrogen content. In the following parts of this paper, the dried fraction obtained from the watery extract by precipitation with alcohol is called the albumin-proteose fraction, the fraction obtained from the watery extract which was heated and acidified before precipitation with alcohol is called proteose, and the fraction from the alkaline solvent is called glutenin."

In their latest publication, however, Caulfield and his associates lay particular stress on the protein fractions of the ragweed pollen in experimental and clinical tests. They make no further reference to the clinical study of vernal cases with the fractions of timothy pollen.

In the United States the pollens of timothy and of orchard grass are the chief and important causes of vernal hay fever. The paucity in the literature of any systematic study of their protein fractions and their clinical significance has stimulated our efforts and warrants the following preliminary report:

PROTEIN FRACTIONS OF POLLENS OF TIMOTHY (PHLEUM PRATENSE L) AND ORCHARD GRASS (DACTYLIS GLOMERATA)

The material used for our study consisted of the pollen of timothy and orchard grass. Analytical data regarding the pollen are given in *Tables I and II.*

TABLE I

COMPOSITION OF POLLEN*

	Orchard Grass Per Cent	Timothy Per Cent
Nitrogen	4.51	4.00
Ash	3.98	4.31
Ether extract	3.00	3.21

*Analyses based on moisture-free material.

TABLE II

DISTRIBUTION OF NITROGEN

	Orchard Grass	Timothy
	Per Cent of Total N.	
Salt soluble (10% NaCl)	17.5	9.85
Alkali soluble (0.2% NaOH)	20.8	15.4
Non-protein N.	25.7	24.9
Residual N.	36.0	49.8

As a preliminary study we exhaustively extracted 5 grams of timothy pollen with 10 per cent sodium chlorid solution, 70 per cent alcohol and 0.5 per cent aqueous sodium hydroxid in the order given. Clinical tests made on these extracts showed that the salt extract contained the proteins that were most reactive to hay fever patients. The salt extract would contain the albumin, globulin and proteose fractions of the pollen if they were present. The activity of the protein in the alkali soluble fraction was negligible.

In order to test the relative activity of these three proteins individually, pollen which had been previously extracted with ether to remove substances of a fatty nature was extracted with 10 per cent sodium chlorid solution, so long as any nitrogen was being removed. The residue was then exhaustively extracted, first with alcohol and finally with 0.2 per cent sodium hydroxid solution. The trace of globulin present was separated from the salt extract by dialysis. The coagulated al-

bumin obtained by heating the dialysate was filtered off, and upon the addition of alcohol to the clear filtrate, a proteose fraction was obtained.

In another preparation of the pollen proteins, two proteose fractions were obtained. A 10 per cent sodium chlorid extract of 409 grams of timothy pollen was saturated with ammonium sulfate. The resulting precipitate was dissolved by addition of water, and the solution was freed from salts and globulin by dialysis. After heating the dialysate, and filtering off the coagulated albumin, alcohol was added to the filtrate, which precipitated a fraction designated as proteose A.

The original filtrate from the precipitate obtained after saturating the sodium chlorid extract with ammonium sulfate was dialyzed to eliminate salts, concentrated to a small volume and boiled and filtered to remove any coagulable protein. Upon the addition of alcohol to the clear filtrate a precipitate was obtained which we termed proteose B.

In summary, four active proteins have been isolated from timothy pollen, which we have designated respectively proteose A, proteose B, albumin, and glutelin. The yield, derived from 409 grams of pollen, which, of course, represents the minimum quantity, is given in *Table III.*

TABLE III

YIELDS OF PROTEINS OBTAINED FROM TIMOTHY POLLEN

Protein	Yield Grams	Yield Per Gram of Pollen Grams
Proteose A	1.274	0.0031
Proteose B	1.623	0.0039
Albumin	0.501	0.0012
Glutelin	.....	0.0023

CLINICAL OBSERVATIONS

Three series of cutaneous tests have been performed on different subjects of vernal hay fever. The patients exhibited typical symptoms of the disease and gave a positive skin reaction with the pollen of timothy. Timothy pollen proteins have been used exclusively in the study of the vernal group because of the greater quantity of material.

In the preliminary tests, the three extracts derived from the timothy pollen have been employed, namely, the salt-soluble, the alkali-soluble, and the alcohol-soluble. A drop of each fraction was placed on the anterior surface of both forearms and a superficial needle scratch made through each drop. The results are indicated in *Table IV.* It is noteworthy that the salt-soluble extract yielded 100 per cent positive cutaneous reactions in fourteen tests, and the alcoholic extract 55 per cent positive in seven tests. A consideration of the individual constituents of each extract aids in the interpretation of the positive skin reactions. Obviously the important proteins, proteose, albumin and globulin, are included in the salt-soluble extract, whereas the alkali extract contains the glutelin. The alcoholic extract is made up chiefly of lipoids and presumably some minimal quantities of the active proteins.

TABLE IV

CUTANEOUS TESTS WITH THREE FRACTIONS OF TIMOTHY POLLEN

	Positive	Negative	Total
Salt-scluble fraction	14	0	14
Alkali-soluble fraction	4	9	13
Alcohol-soluble fraction	4	3	7

TABLE V

CUTANEOUS TESTS WITH TWO PROTEIN-FRACTIONS OF TIMOTHY POLLEN

	Number	Per Cent
Sensitive to proteose and albumin fractions	7	53
Sensitive to proteose fraction only	6	46
Sensitive to albumin only	0	----
Total	13	

Table V indicates the results of similar cutaneous testing made on thirteen subjects with the isolated proteins. The tests were made with a solution containing 1 mg. of protein per c.c. of solvent. The proteose fraction was dissolved in Bernton's fluid, whereas the albumin and glutelin were dissolved in a weak sodium hydroxid solution to which 2 volumes of glycerol were added. Cutaneous testing showed that seven patients, or 53 per cent, were sensitive to proteose and albumin, and that six patients, or 46 per cent, were sensitive to the proteose only. No patient in this series was sensitive to the albumin exclusively. One patient, however, showed a sensitiveness to the glutelin in addition to the proteose and albumin. We are of the opinion that the glutelin fraction is of negligible importance. A control group of eleven patients other than vernal hay fever subjects has given negative reactions with the three proteins.

TABLE VI

CUTANEOUS TESTS WITH THREE PROTEIN FRACTIONS OF TIMOTHY POLLEN

	Number	Per Cent
Sensitive to proteose A and B and to albumin	8	42
Sensitive to proteose A and to albumin	4	21
Sensitive to proteose A fraction only	4	21
Sensitive to albumin only	3	15
Total	19	

In *Table VI* are embodied the results of testing a group of nineteen patients with the proteose A, proteose B, and albumin of timothy. A solution of each protein was so made that their quantitative relationships in the pollen

were maintained (*Table III*). Different solvents were found necessary to effect solution of the proteins. Distilled water was used as a solvent for proteose A, physiological salt solution for proteose B, and sodium hydroxid solution for the albumin. To each, two parts by volume of glycerol were added to preserve potency and prevent decomposition changes. The solutions were sterilized by Berkfeld filtration. Passage through the Berkfeld filter, it is to be noted, did not affect the capacity of a fraction to excite a skin reaction. Comparative tests with the filtered and non-filtered solutions proved them to be of equal potency.

The technic of testing is similar to that followed in the two groups previously reported. The surfaces of both forearms were utilized and the drops of the test materials were placed far apart. It seemed desirable to eliminate the influence of the vigorous local response of one protein upon neighboring test scratches. In general, it may be stated that the proteose solutions have been placed on one forearm and the albumin solution on the other. Control tests with the solvents have also been performed.

The cutaneous tests indicate that eight of the nineteen patients, or 42 per cent, are sensitive to the three proteins; that four patients, or 21 per cent, are sensitive to both proteose A and the albumin; that four patients, or 21 per cent, are sensitive only to proteose A, and that the remaining three patients, or 15 per cent, are sensitive only to the albumin. It thus appears that twelve, or 63 per cent, are sensitive to two or more of the proteins. Eight of this number show a greater cutaneous sensitiveness to proteose A than to the albumin; three show the converse of this condition; and one shows an equal sensitiveness to both. The difference in sensitiveness is based upon the intensity of the local reaction and the time necessary for its production. Curiously enough, cases of sensitiveness to proteose A and B or to proteose B alone were not encountered.

Analysis of the clinical data affords no means of distinguishing multiple protein sensitiveness from single protein sensitiveness. The age of the patient and the duration of the disease seem to exercise no influence. The minimum duration of the disease in the group sensitive to the three proteins is four years and the maximum is thirty-five years. In the groups of single sensitiveness, the minimum duration is two years, and the maximum seventeen years. The youngest patient in this series is eight years of age. He manifested a sensitiveness to proteose A and albumin. The duration of his vernal hay fever has been three years.

The three patients who constitute the small group sensitive only to the albumin invite our special attention. Unlike the other sixteen members of this series, they have not been benefited by courses of preventive inoculations with the extract of the whole timothy pollen. In fact, two of the patients have failed to obtain any relief whatsoever in two successive years (1925 and 1926) of pre-seasonal treatment. It is to be borne in mind that the solutions of the proteins employed in testing have contained the respective proteins in amounts proportional to those of the whole pollen grain. Accordingly, the three patients under consideration have shown a sensitiveness to the albumin solution in a concentration equal to one-third of either the proteose A or proteose B solution. Moreover, the albumin content represents at least one-ninth of the total extractable proteins. The conclusion is warranted that the protein extract of the whole pollen, used in prophylactic treatment, has not contained enough of the albumin to effect adequate desensitization in the albumin sensitive cases. Furthermore, the clinical course of hay fever has been unusually severe in the three patients. Notwithstanding this fact, asthmatic symptoms have been absent. Accordingly, the suggestion presents itself that the albumin fraction of grass pollen is not responsible for the asthmatic complications of vernal hay fever. The majority of hay fever subjects, 72 per cent in our experience, suffer from some form of asthma, and the majority, 84 per cent in this series of vernal hay fever, exhibit a sensitiveness to proteose A.

The results of treatment in the members of the series have been gratifying with the three notable exceptions discussed above. We have followed our usual routine of administering 16 to 19 injections of the extract of whole timothy pollen. The initial dose consists of 5 pollen units, which is gradually increased to the terminal dose of 1,600 pollen units. According to the calculations based on our minimal yield of the three proteins, a patient receives during such a course of prophylactic treatments the following total amounts:

0.000,034,503 gram proteose A
0.000,043,407 gram proteose B
0.000,013,356 gram albumin

In this connection, it is of interest to note

that some hay fever subjects are so sensitive that the initial dose of 5 pollen units of whole extract, or even intracutaneous testing, may provoke symptoms of the disease. The amount of protein which thus intoxicates approaches the infinitesimal; and the toxicity unit per kilo of body weight finds no analogy in the realm of clinical medicine.

It may not be amiss, therefore, to report that for the first time three hay fever subjects have received a course of treatment with a solution of the proteose A fraction derived from timothy pollen. The patients have enjoyed almost complete freedom from symptoms and feel pleased with the results. It is not our desire to draw any deduction from this small number of cases treated. We do, however, wish to record that three subjects have received treatments with a solution of timothy pollen protein, to which they have been proven sensitive by cutaneous test, without jeopardy to life or to health.

Autumnal hay fever due to the ragweeds is essentially an American disease. It is much more prevalent than the vernal type. Consequently greater attention has been given to the chemistry of ragweed pollen by American investigators. The most notable contributions, published in 1917 and 1919, have been made by Heyl.[19] [20] His classic work will continue to serve as a model in this field of research. Heyl isolated from the pollen of the short ragweed three important proteins: an albumin present to the extent of 1.2 per cent, proteoses present to the extent of 3 per cent, and a glutelin fraction extractable with dilute alkalies. These findings bear a striking similarity to our own with timothy pollen. Heyl's investigations, despite their thoroughness from a chemical viewpoint, are of limited clinical value. The author reports that he has been obliged to remove to the hospital a hay fever subject because of the very severe reaction produced by an injection of a solution containing about 0.000,007 gram of albumin. This experience discouraged further clinical tests. The following suggestion made by Heyl is of interest to us:

"In the opinion of the writer, it remains for some large hay fever clinic to test out the various proteins, especially the proteose, and determine which of them may be responsible for hay fever. This proteose is unstable and becomes insoluble on preserving so that a very close cooperation must exist between the clinicians and those doing the chemical work."

In 1918, Koessler[21] reported a study of the chemical composition of ragweed pollen. No reference is made to the isolation of any individual protein or to any clinical observations. The work deals chiefly with a study of the compounds resulting from hydrolysis of the pollen protein as a whole.

Six years later, in 1924, Bauman, Chudnoff and Mackenzie,[22] in their attempt to separate the active constituent of ragweed pollen, conclude by inference that "it is in the form of a large molecule or aggregate." They designate the globulin fraction as the more active agent. These authors, it is to be noted, assumed the existence of a single "active constituent."

In 1925 and 1926, Caulfield, Cohen and Eadie,[18] to whose work previous reference has been made, presented a comprehensive study of the ragweed pollen, both chemical and clinical. These authors isolated four fractions, which they designate alcohol extract, albumin-proteose, proteose and glutenin. They tested by the cutaneous scratch method fifty consecutive cases of ragweed hay fever. The report of their findings is herewith quoted:

"In this group the albumin-proteose fraction caused a definitely greater skin reaction than did any other fraction in 78 per cent of the cases. In 34 per cent of the cases the sensitization to the proteose fraction was equal, or at least marked, in comparison to the reactions with other fractions. By deduction, then, 44 per cent of the cases were predominantly (or exclusively in a few cases) sensitive to albumin alone. The tests with glutenin were in comparison moderate in 16 per cent and marked in 22 per cent; with the alcoholic fraction moderate in 28 per cent and marked in 20 per cent."

Moreover, Caulfield and his associates have treated fifty-nine cases, using solutions made up from the different fractions, together with a solution made up by glycerin and salt extraction. In other words, the extract of the whole pollen has been reinforced with a solution of a protein fraction.

"Although complete protection was not obtained in all, it was felt," they report, "that the results were better than would have been obtained had but a single solution been used. It was entirely satisfactory in that all cases protected in previous years experienced as good or better results on their multiple solutions."

Attention is invited to the fact that Caulfield and his associates have been employing a solution of proteose-albumin and that the albumin itself has not been isolated. Therein does a difference exist between their work and that of Heyl's and our own. The same holds true of the chemical work with the grass pollen.

We have utilized 100 grams of the pollen of the short ragweed (Ambrosia artemisiaefolia L) and have obtained the proteose and albumin

separately. With these proteins, cutaneous tests by the scratch methods have been performed on fourteen subjects of autumnal hay fever due to the ragweed. Having been impressed by Heyl's experience, we endeavored to avoid constitutional reactions. Minute amounts of the fractions were applied in powder form to scratch marks on the forearm and covered with a drop of solvent solution. One fraction was employed at a time, and the patient was requested to return the next day for testing with the second fraction on the other forearm. Despite these precautions, the test scratch with the albumin provoked in one individual very severe hay fever symptoms of one week's duration.

Of the fourteen autumnal patients tested, seven, or 50 per cent, have been sensitive to both proteose and albumin; five, or 35 per cent, have been sensitive to the proteose alone, and the remaining two patients, or 14 per cent, have reacted only to the albumin of the ragweed pollen.

We have, furthermore, treated prophylactically one patient with double sensitiveness with a solution containing equal parts of proteose and albumin. This patient is 31 years of age and has been a victim of autumnal hay fever for twenty-two years. He has previously received pre-seasonal treatment for five successive years. These treatments, administered by others and by us, have afforded little or no relief. The patient reports that the hay fever season just passed has been the best since the inception of his disease. He has traveled by train from Washington to his home in Wisconsin and returned without the usual discomforts. He has enjoyed complete freedom from asthma and almost complete freedom from hay fever symptoms.

This case is presented not for the purpose of drawing conclusions concerning the efficacy of treatment, however favorable. We desire to call attention to the fact that treatments with proteins derived exclusively from ragweed pollen have been, and can be, safely administered.

The summary of our work thus far is as follows:

(1) Four active proteins have been isolated from timothy pollen. These are designated proteose A, proteose B, albumin, and glutelin.

(2) Sixty-three per cent of nineteen vernal hay fever subjects show a cutaneous sensitiveness to two or more proteins. Twenty-one per cent are sensitive only to the proteose A fraction and 15 per cent only to the albumin.

(3) The albumin constitutes one-ninth of the total extractable protein content. The albumin sensitive patients have failed to derive any benefit by pre-seasonal treatment with an extract of the whole pollen.

(4) The glutelin is of negligible importance.

(5) Proteose and albumin have been isolated from short ragweed pollen.

(6) Autumnal hay fever patients exhibit cutaneous sensitiveness to either one or both of these proteins.

(7) Four patients have received a complete course of prophylactic inoculations with solutions exclusively of protein fractions of pollen without the production of symptoms of anaphylactic shock.

CONCLUSIONS

Contrary to the earlier observations, we find that the toxic action of pollen upon susceptible individuals is not restricted to the albumin. Cutaneous testing has demonstrated a sensitivity of patients to one or more proteins isolated from pollen. A greater success in the prophylaxis of hay fever may attend the recognition of this fact in therapeutic procedures.

It is our pleasure to acknowledge with thanks the cooperation of Mr. Morgan W. Evans, Agronomist, Forage Crop Investigations, United States Department of Agriculture. Mr. Evans has successfully devised means for collecting pollen and has provided us with the large amounts necessary for the chemical study which has made this contribution possible.

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DISCUSSION (Abstract)

Dr. Ray M. Balyeat, Oklahoma City, Okla.—Every physician who has treated seasonal hay fever with pollen therapy has had a similar experience; in about 5 to 10 per cent of seasonal cases treated with pollen therapy we obtain no results. We have likewise all had similar experiences in trying to explain the lack of these results. In some instances with two patients sensitive to the same pollen proteins, whose symptomotology was the same and whose nervous make-up was similar, the treatment of one has given complete relief from symptoms and treatment of the other absolutely no relief. I have tried to make myself believe in some cases that the patient had such marked hypersensitiveness of the mucous membrane of the nose that we were unable to desensitize him sufficiently to relieve his symptoms. In some cases I have felt that there were other proteins to which they were sensitive that we did not use in treatment. However, these explanations have not been entirely satisfactory in the majority of cases, because most of the cases were studied rather carefully and tested with all the known proteins.

I was most interested to know of Dr. Bernton's work with the pollen granule. For several years we have had patients who were sensitive to split products of foods, who were not sensitive to whole food, making us believe that a good many patients with dermatitis, especially the eczemas and urticarias, may be sensitive to split products of foods, which in many cases we are not able to test for inasmuch as we have been able to split only a few of the food products. I have had many cases sensitive to western ragweed and not sensitive to the other ragweeds, and I have treated them with the three ragweeds combined without results, whereas when I treated them with only the western ragweed I obtained good results. Why? Because they were treated with the ragweed in the first place to which they were not sensitive, or they were treated with the ragweed product that was diluted with other ragweed extracts to which they were not sensitive.

I can think of no more reasonable explanation of the failure in 10 per cent of the pollen seasonal hay fever than that Dr. Bernton has presented this afternoon. He has shown us that he has isolated four different protein fractions from the pollen granule, and that patients may be sensitive to one fraction, even a minor one, and not to the other fractions. My experience with the ragweed products has shown me, as I have mentioned, that patients sensitive to one ragweed must be treated with one and not with a combination of the three, inasmuch as the other two ragweeds are diluants and the product will not be strong enough to give results. This would also hold true in those cases which are sensitive to one of the minor fractions of the pollen granule, so it seems reasonable to me to believe that Dr. Bernton is on the right track. We must take the fraction to which the patient is sensitive and make up an extract from that fraction. Nothing in the treatment of hay fever today that has caused us more disturbance than the effort to deal with these 5 or 10 per cent of cases with which we get no results. Of course, as Dr. Bernton has pointed out, four cases prove nothing and time only will tell. I shall wait eagerly for further investigation along this line.

Dr. Warren T. Vaughan, Richmond, Va.—At present there are very few who will deny the existence of allergy, even among our friends of the nose and throat profession, who have been the last to accept the theory. As both Dr. Bernton and Dr. Balyeat have brought out, there are failures in treating hay fever as an allergic state and the next problem is to find an explanation for these failures. Two factors, as I see it, play a part: the patient and the test protein or the specific allergen. The fault may be in the patient as well as in the therapeutic protein. Again, the cause may be either specific or non-specific.

Poor results in hay fever cases may be obtained in spite of satisfactory desensitization on account of pathological conditions in the accessory sinuses. Here a non-specific accessory factor plays a part. A person may be sensitive to several proteins. For instance, he may be sensitive to a food protein which is being eaten regularly and giving no symptoms. But with a superimposed pollen sensitization, the two proteins acting together are sufficient to produce symptoms. Here the additional factor is specific.

Dr. Bernton has gone into more basic considerations. We cannot expect results if we are not sure of our test proteins. He has demonstrated that fractions which are almost infinitesimal may give positive reactions when the whole protein gives negative reactions. This has its analogy in our food tests, as we have repeatedly observed negative results from whole wheat protein and positive results from some of the protein constituents of wheat. We have all seen individuals sensitive say to strawberries, clinically allergic cases, who yet could not be made to give reactions to strawberry protein.

Dr. Hal M. Davison, Atlanta, Ga.—Some of the most interesting groups of hay fever that we have to study are those that give very marked clinical symptoms and yet when tested out give very small reactions by both the scratch and intracutaneous method. We have obtained results in treating some of these by beginning the treatment with solutions that contain even more pollen than the strongest commercial extract that can be bought. Until we can obtain these individual proteins that Dr. Bernton has given us, this will have to be our method of treatment.

The severity of symptoms gives absolutely no evidence of the reaction to be obtained from the skin test. That

was one of the hardest things to understand when we began the study of hay fever.

The next thing of great interest to me in the treatment of asthma or vasomotor neuritis is the sensitiveness to wheat flour. Some of the cases will react to spring wheat that will not react to winter wheat, and we get stronger reactions to whole wheat sometimes than to the flour fraction. In the treatment of asthma caused by wheat, we get very poor results. We have some cases that give very strong reactions to the tests, but when given strong doses they do not stop having asthma, even if wheat is taken away altogether. I suppose that is due to the fact that we cannot remove flour from the homes and these patients continue to get some of it in their noses and eyes. When the proteids are separated, split up and given to us in commercial form, that problem may be answered.

Dr. Bernton (closing).—I was requested to tell you of a case of angioneurotic edema. This was an unusual case. When I asked the patient what he thought caused the trouble, his reply was "Beans, the ordinary navy beans." It was my good fortune to have two pure proteins in powder form derived from the beans. I tried one of the fractions on one arm and the other on the other arm. The first fraction, conphaseolin, gave as marked and positive a cutaneous reaction as I have ever seen; the other fraction, phaseolin, was entirely negative.

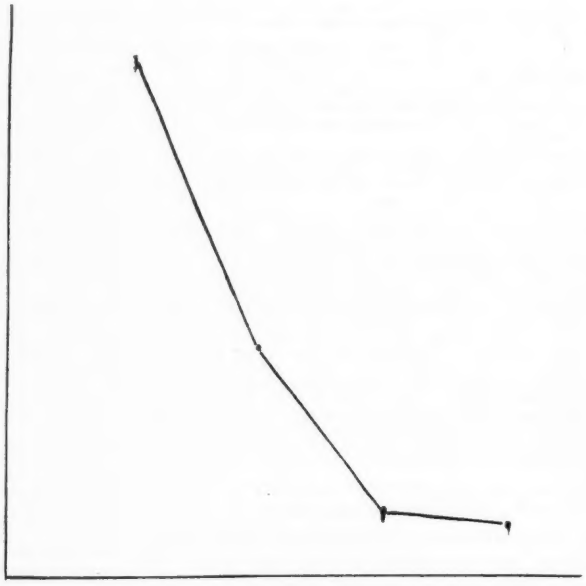
I wish to emphasize the fact that we have treated patients with the pure protein fractions. As has been suggested, time alone will tell the value of the method. Time always does.

THE CURVE OF PHENOLSULPHONEPHTHALEIN EXCRETION; ITS INTERPRETATION AND CLINICAL USE*

By A. J. Crowell, M.D., F.A.C.S., Charlotte, N. C.

Since the introduction of phenolsulphonephthalein as a test dye of kidney function, it has been sufficiently studied experimentally and clinically to be recognized by

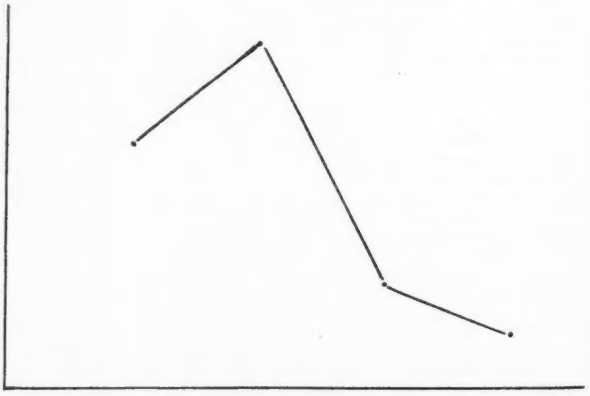
*Read in Section on Urology, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.



Normal curve.

CHARACTERISTICS

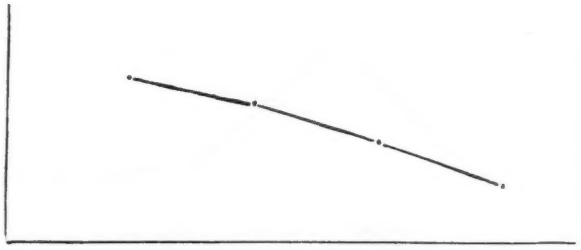
(a) Peak high, first period.
(b) Steep slope.
(c) Small dye output at end of test.
(d) Average total output about 70 per cent following intravenous injection.



J. B., boy, aged 16, subacute nephritis, favorable progress. Total 58 per cent in two hours. Nephritis followed acute infection.

CHARACTERISTICS

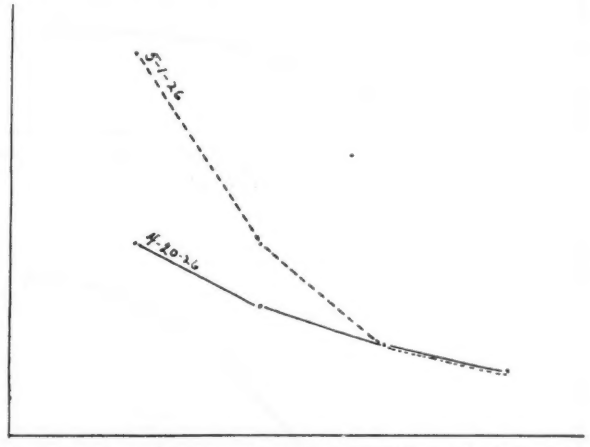
(a) Peak delayed to second or third period.
(b) Curve thereafter runs about parallel with normal.
(c) Total output may be good.
(d) With favorable outcome the curve approaches closely to the normal type.



Curve of cardiorenal hypertensive disease. Smith, male, age 41, chronic nephritis, hypertension, normal blood nitrogen.

CHARACTERISTICS

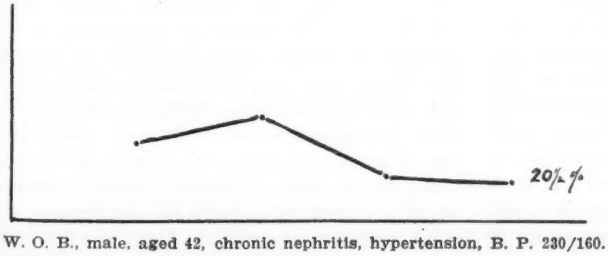
(a) Peak low but occurs at beginning.
(b) Slope gradual.
(c) Higher output than normal at the end of test.
(d) Total output fairly good, but the entire curve approaches the base line if patient is getting worse. With functional improvement, the peak rises and the slope becomes more abrupt.



Mrs. W. C. S., aged 48, chronic passive congestion of the kidneys with marked anemia. Improvement in curve of dye output after ten days' rest in bed.

USUAL CHARACTERISTICS

(a) "Plateau" type of peak.
(b) Gradual slope.
(c) Total output definitely diminished.
(d) Approaches normal curve rapidly as heart compensates following suitable treatment.

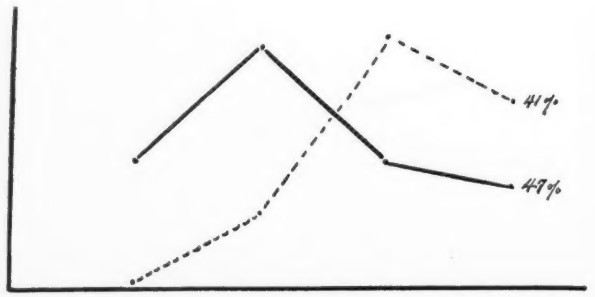


W. O. B., male, aged 42, chronic nephritis, hypertension, B. P. 230/160.

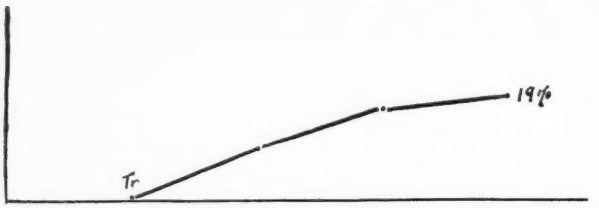
the profession as the most useful single means of determining renal function. There has been, however, some reservation in the minds of all as to its infallibility. Many of us have seen cases of nephritis and cardiovascular hypertensive renal disease in which the total 'phthalein in two hours was good and blood nitrogen still normal, although the kidney injury had reached a fairly advanced stage. The two-hour test, however, repeated and administered under different conditions, gives at least a rough estimate of the kidney's reserve power, but does not enable one to detect early kidney lesions satisfactorily, nor to differentiate their types.

All of us who do genito-urinary surgery have relied largely upon the hourly 'phthalein output and blood nitrogen estimation as a guide to operability, and yet it has been hard to fix arbitrarily a 'phthalein output above which operation may be performed without danger of the patient's developing post-operative renal insufficiency. We have seen patients with a very poor two-hour 'phthalein output, taken at hourly intervals, do extremely well following prostatectomy, and others with a fairly good total output develop post-operative uremia and have a stormy recovery, or even die. In the former instance there was kidney reserve power, and none or but little in the latter. Shaw, working at the Brady Urological Institute, Baltimore, observed these same phenomena and was led to estimate the time element of the 'phthalein elimination in both the healthy and diseased kidney. He apparently finds in the plotted curve of dye elimination a satisfactory explanation of the previously mentioned clinical discrepancy in that the peak of the 'phthalein elimination was reached within the first fifteen minutes in the healthy kidney and delayed in the diseased

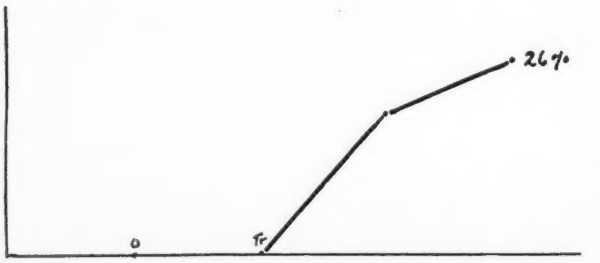
one in proportion to the type and extent of the injury. Over half the dye recovered in two hours was eliminated by the healthy kidney during the first fifteen minutes and in the diseased kidney its elimination was delayed in proportion to the extent and character of the disease. This explains why the kidneys may be diseased and yet sufficiently active to prevent undue nitrogenous retention until reserve is needed in sickness or operation, where it is wholly inadequate. The peak of elimination may be delayed and yet the total output in two hours' time may be fairly good, although the kidneys are extensively diseased. The greater the delay in the peak and the more gradual the decline in the curve of dye excretion, whether taken in fifteen or thirty minute intervals, the more extensive is the kidney involvement. For all practical purposes the half-hour intervals are sufficient. This gives an idea of the kidney reserve power.



D. G. Mc., male, aged 63, carcinoma of the prostate, with urinary obstruction. Inoperable case. Treated with roentgenotherapy. Dotted curve shows the dye output one week after the solid line curve and just after a course of deep therapy.



McD., male, aged 60, prostatic obstruction with infection, complete retention, supra-pubic drainage. Death. Blood at death showed non-protein nitrogen 272 mg., creatinin 6.6 mg.

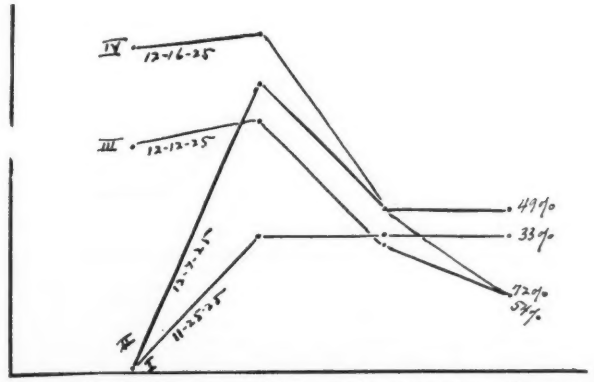


P. H., male, aged 73, prostatic obstruction with infection, complete retention. Died during the process of preparing for operation. gradual reduction of residual followed by retention catheter.

We have used this method to check Shaw's findings in the healthy kidney and have used it sufficiently in various pathological conditions in which it is applicable, to be thoroughly convinced of its great value in enabling one to ascertain the degree and often the character of the involvement.

It has been definitely shown by Rowntree and Geraghty, and it has been quite generally accepted by the profession, that the 'phthalein elimination is independent of the fluid output. Some observers think, however, that its elimination may be increased somewhat by the fluid output in severe cases of interstitial nephritis. This makes the fluid output, as a rule, insignificant, but it is of great importance that the entire interval's secretion should be secured for estimation. In cases of chronic retention due to hypertrophy of the prostate, stricture, nerve lesion or any pathological condition resulting in retention, the catheter should be used and great precaution taken to obtain the entire interval's output for the estimation. Hydronephrosis is another condition which might be misleading and should always be kept in mind.

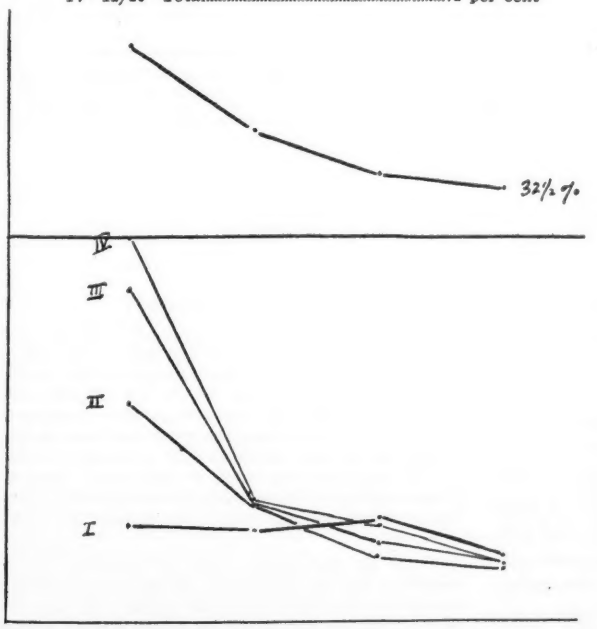
Kidney injury, due to chronic retention and infection, which are practically always associated, is not necessarily in proportion to the amount of residual urine or length of time it has existed, but, as a general rule, the longer it has persisted the more certainly there will be renal damage. We have observed cases with but little residual urine, as is usually the case in malignant prostates, in which extensive pressure atrophy existed as a result of the frequent efforts to empty the bladder. Here we have back



Davis, male, aged 65, myocarditis, prostatic obstruction. The several curves show the improvement during the pre-operative treatment with a partial return to normal type and a marked increase in the total output.

Curves obtained during the pre-operative period:

I	11/25	Total	33 per cent
II	12/7	Total	49 per cent
III	12/12	Total	54 per cent
IV	12/16	Total	72 per cent



Pickett, male, aged 60, prostatic obstructing bar following a suprapubic prostatectomy. Caulk's cautery punch used to remove obstruction. The patient showed striking clinical improvement as the curve approached the normal type. A suprapubic fistula healed promptly.

Top: Before operation.

Bottom: After operation, punch to remove prostatic bar.

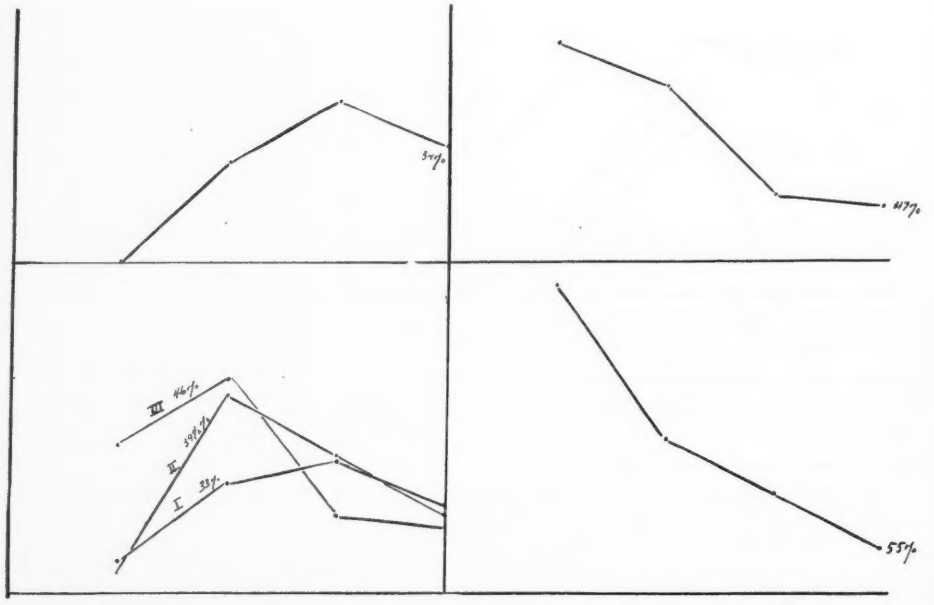
I	8/18	Total output	27.5 per cent
II	10/16	Total output	35 per cent
III	12/8	Total output	46 per cent
IV	3/24	Total output	51.5 per cent

pressure but of a different type from that resulting from large amounts of residual urine. In cases of renal injury due to back pressure, the first half hour's output indicates the extent of damage done as well as what may be expected following drainage.

Shaw observed that in fifty-six cases of known renal lesions, tested out and reported at the Washington meeting of the Genito-Urinary Surgeons Association, February, 1926, the majority were due to back pressure and infection. Following drainage, the peak of elimination occurred earlier as the function improved, while the two-hour output may have remained unchanged. We have observed this same phenomenon in our work clinically and find ourselves depending more and more upon the peak and curve as a guide to operability in cases of hypertrophy of the prostate.

McNider's experimental work demonstrates that renal injury is produced more easily, develops more rapidly, and persists longer in older animals than in young ones. This should be a warning to all of us, and especially to the genito-urinary surgeon, against undue haste in operating upon old people. McNider shows that in cases of tubular injury in animals the earliest functional indication of this injury is the appearance of albumin in the urine and a reduction in the 'phthalein output. Coincident with these signs there appears a disturbance in the acid-base equilibrium of the blood. This is an important fact to be kept in mind, but it is too great a field to enter upon in this paper.

We have followed the curve of 'phthalein elimination repeatedly in more than one hundred and fifty cases that have presented themselves at our Clinic for examination and treatment. This group includes a number of cases showing an apparent normal kidney function as well as those show-



Miller, aged 65, prostatic obstruction, complete retention of urine, large amount of residual, irregular heart with dyspnoea and beginning oedema. The various dye curves show the effects upon the dye excretion as a prostatic case, with large amounts of residual passes through the catheter reaction. With successful drainage following the operation, the curve may take on normal characteristics.

Top left: Admission curve. 8/21/25.

Top right: After decompression of the bladder. 9/2/25.

Bottom left: Passing through the catheter reaction.

I	9/24	Total	33	per cent
II	10/17	Total	39.5	per cent
III	11/2	Total	46	per cent

Bottom right: Four months after prostatectomy. 4/7/26.

ing varying types of kidney functional disturbance, arising both from conditions treated surgically and from diffuse nephritis of a purely medical type.

Shaw's type curves have been duplicated in the testing of our own cases and we feel that his interpretations and deductions are correct. Emphasis should be made on the value of these observations as a guide to operability and subsequent progress, especially of those cases presenting renal injury due to prostatic obstruction.

Furthermore, the dye excretion curve is of great value as a means of diagnosis of certain forms of nephritis which might otherwise be overlooked and is an indication of the subsequent course of the disease. In the cardiorenal hypertensive type, repeated determinations are an excellent indicative guide as to the progress of the case.

DISCUSSION (Abstract)

Dr. Montague L. Boyd, Atlanta, Ga.—If we were dependent upon a single functional test of the kidneys to obtain all the data on which we are to rely for our conclusions, that test could not be too elaborate, but fortunately it is not often necessary to come immediately to a conclusion concerning the renal functional ability, because as yet our information is so inadequate that several functional tests must be done over longer or shorter periods of time, and before and after those factors which are producing renal damage have been removed.

Within the past twenty years our knowledge has increased so that the conclusions of the average urologist concerning the renal functional ability are very accurate. But for obtaining that knowledge he depends upon a great many factors, some of which he is hardly aware of: the general appearance of the patient, his age and weight, whether albumin is present in the urine or infection in the kidneys, the concentration of the blood constituents and the frequency with which the patient urinates in relation to the size of the bladder.

Since we have so many factors to consider in drawing conclusions about the functional ability of the kidney, it is, as Dr. Crowell has said, for practical purposes

not necessary to resort to elaborate renal functional tests.

The principal information which we get from Dr. Crowell's paper is that for obtaining the most information from the intravenous injection of 'phthalein in renal function tests we must collect the urine for at least twenty or thirty minutes after the injection, in which time the peak of elimination is reached by the normal kidney. To do that, it is not necessary for the urologist to change very much his usual methods of performing the separate renal functional test. The average urologist collects the urine for fifteen to twenty minutes after the appearance of the dye in the urine, and in that time he is able to estimate whether or not this peak of elimination has been reached. But to obtain the total functional test through the bladder, it is necessary, if you are going to employ the intravenous method, to insert a catheter into the bladder a few minutes after the injection of the dye and collect the specimen in several parts.

Dr. E. Clay Shaw, Miami, Fla.—The curve of 'phthalein excretion when the urine is collected frequently can be made the most sensitive test we have of renal function.

In most of my work I have collected the 'phthalein at fifteen minute intervals, but for ordinary purposes it is not necessary to collect it more often than every twenty minutes. However, if we want accurate data regarding cases in which the type of kidney injury is to be determined, fifteen minute collections will give by far more accurate data than thirty minute.

We have merely scratched the surface in obtaining the true usefulness of the renal 'phthalein test. We should be able by means of these curves to get at least a rough estimate not only of the reserve power of the kidney but in many cases of the actual type of disease injury that has been inflicted.

Dr. R. Arthur Hooe, Washington, D. C.—We have all had cases in which the peak of output was found to be reached during the second hour. Such delay, however, in my opinion, occurs in the minority of cases. A point of value, one I think worth stressing, is that the amount of output of the dye is of no greater significance than is the time of its appearance. The percentage of output, the total output, as a rule is found diminished in proportion to the prolonged time of appearance.

Another point that would seem worth noting is the difference in functional activity in cases of derangement, particularly those resulting from back pressure. In some the activity is low, unstab'e, varying at different observations. In others, function, although definitely impaired, is at a more or less constant level, without fluctuation. This latter group, of course, offers the more favorable prognosis.

I should like to hear Dr. Crowell's opinion regarding the relative value of the time of appearance.

Dr. Crowell (closing).—I heartily agree with Dr. Boyd in that we should not take any single kidney function test as a criterion. The patient's general appearance to one of experience is very important. The kidney function may be good for two hours' time and yet there may be something about the general appearance of the patient that causes you to proceed to operation with a great deal of precaution. However, the peak and curve of the 'phthalein elimination, as a kidney function test, is most valuable. Since we have been relying largely upon this test, taken in half hour intervals, we have lost only one case following prostatectomy. This was a patient upon whom we did not use the test. A suprapubic drainage had been made, and if the test had been used it would have been inaccurate. From a clinical standpoint, the patient apparently was a good risk, but undoubtedly the kidney had no reserve power. Following the operation his non-protein nitrogen gradually went up until death, although it was normal prior to operation.

Dr. Hooe remarked that the peak was not reached in many cases until the second hour. That fact makes this test a very valuable one. The greater the delay in the peak and the more gradual its curve, the greater the damage already sustained by the kidney. The whole 'phthalein output may be fairly good, taken at hourly intervals, and yet the kidney may be extensively diseased. The blood non-protein nitrogen may be normal and yet the kidney may be working at its full capacity. Any instrumentation or operation in such a condition will so interfere with the kidney's function as to diminish its output and increase the blood nitrogen retention.

VEGETAL BRONCHITIS: OBSERVATIONS ON FIFTEEN CASES*

By PORTER STILES, M.D., F.A.C.S.,
Birmingham, Ala.

Vegetal bronchitis is the name suggested by Jackson[1] to describe the severe tracheo-bronchitis with systemic toxemia that follows aspiration of vegetable foreign bodies. This reaction, first noted in patients with peanuts in the bronchi, is a prominent feature of almost all foreign body cases in which the intruder is a vegetable substance of any sort; and it is most severe in young children, especially those under three years of age.

In a series of sixty-six foreign body cases, we have had fifteen of this type. An additional vegetable case, that of a canna seed in the trachea, is not included, as the seed was removed two hours after its aspiration, and before the development of any symptoms other than dyspnea and cough. The foreign bodies in question were: one piece of potato, one pecan kernel, one grapefruit seed, three peanuts, four watermelon seeds, and five grains of corn (maize). They were located at the time of bronchoscopy as follows: the potato, one watermelon seed and two grains of corn in the trachea; the pecan kernel, two grains of corn, one peanut and one watermelon seed in the right bronchus; the grapefruit seed, one grain of corn, two peanuts and two watermelon seeds in the

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left bronchus. The potato was uncooked, and two of the peanuts had not been roasted. All of the patients were children between one and four years of age, except one boy of seven who had aspirated a watermelon seed. All of the cases were of comparatively short duration, in the longest, that of the pecan kernel, the foreign body having been in the bronchus ten days. The average age of the patients was two years and eight months, and the average duration for the series was two and one-half days. None of the patients had had previous bronchoscopic treatment.

As was to be expected, all of the cases were due to ignorance or carelessness, and it is worthy of note from the standpoint of prophylaxis that in twelve instances, the foreign body itself, or the food in which it occurred, was given to the child by an adult who perhaps should have known better. In all cases a positive or suggestive history was obtained, though in several instances it was developed only after questioning and after the diagnosis had been made without it. In one instance, the parents reported the probability of the aspiration of a piece of toast, while bronchoscopy proved the foreign body to be a grapefruit seed. This patient evidently already had a grapefruit seed in his mouth when he began to eat a piece of toast, and his choking during this process gave rise to the misleading theory.

The initial manifestations were observed and described in half of the cases, and consisted of choking, gagging and coughing, with transient dyspnea of varying degree. This stage was followed by a period of comparative comfort and freedom from symptoms, except in the case of the potato in the trachea, in which the initial dyspnea persisted from the first without remission. In the others, the quiescent period was quite short, in no case being longer than twelve hours.

The general symptoms of all of these cases on admission to the hospital showed a certain similarity, but with differences in intensity. Almost all appeared toxic to a more or less degree. There was fever and an elevation of the pulse and respiratory rate in every case. The most severe systemic reaction was observed in a baby fifteen months old, noticeably affected with rickets, and with a peanut in the left bronchus for thirty-six hours. His temperature was 105°, pulse over 160, and respirations 65. His general appearance was one of extreme toxemia and prostration. The other peanut cases exhibited somewhat more systemic derangement than did those of identical age and duration, but with other foreign bodies. All patients in this group, however, showed more evidence, both of local inflammation and systemic intoxication, than is commonly seen in cases of short duration with inorganic foreign bodies.

In the tracheal cases, cough was a constant symptom, usually paroxysmal, and of a peculiar hoarse, croupy character. A rather loud asthmatoid wheeze was heard at times. In two cases, one a grain of corn, the other a watermelon seed, a distinct palpatory thud was noted. Severe dyspnea was observed in two cases, in one due to the lodgment in the subglottic area of a fragment of potato and the production of subglottic edema, and in the other to the swelling of a large grain of corn from moisture until it was almost twice its usual size, and though it remained movable in the trachea, it considerably diminished the airway. Breath sounds were harsh and numerous rales were heard over both lungs. There were no signs of bronchial obstruction either by physical examination or the x-ray. A rather severe tracheitis with redness and swelling of the mucosa and the production of a large amount of thick tenaceous secretion was a constant feature.

The bronchial cases exhibited varying pictures. Cough was, or had been, present to some extent in all cases, severe and paroxysmal in some, and occasional and of slight intensity in others. It was well marked in all the peanut cases, of moderate intensity in the pecan and watermelon seed cases and in two of the corn cases, and was of slight consequence in the other corn case and in the case of the grapefruit seed. Its severity seemed to increase in proportion to the amount of secretion present, and appeared to be due more to the effort to expel the secretions than to the actual irritation of the foreign body itself. In six of the cases an asthmatoid wheeze could be heard at the mouth either constantly or intermittently. It was not characteristic of any particular foreign body. Well marked dyspnea with cyanosis was observed in two of the peanut cases and in the pecan case. In the other cases it was present to only a slight degree. None of the patients complained of localized pain. Hemoptysis was not observed.

The physical signs varied with the conditions present. The grapefruit seed, two peanuts and one grain of corn produced the typical picture of obstructive emphysema; one grain of corn produced complete bronchial occlusion, while the

pecan kernel and one grain of corn gave evidence of partial obstruction both of inspiration and expiration. In the other cases, the signs were those of bronchial irritation rather than occlusion. In all cases there was well marked inflammation of the trachea and bronchi, with greatly increased secretion, most marked in the younger patients and in those of relatively long duration. None of the patients exhibited pneumonia, lung abscess or empyema.

The x-ray was employed in all cases except those few in which the symptoms were so severe that it was felt unsafe to delay bronchoscopy further. It gave quite definite evidence as to the presence and location of the foreign body in the cases in which complete bronchial occlusion or obstructive emphysema had occurred.

The treatment consisted of peroral bronchoscopy, without anesthesia, and was done as soon as the diagnosis was made. It was possible by this means to remove all of the foreign bodies with the subsequent complete recovery of the patients. Because of the existing inflammation and edema of the tracheal mucosa, every effort was made to produce as little added trauma as possible. Toward that end, a bronchoscope small enough to be easily inserted was selected for each case. In addition to removing the foreign body, both bronchi were usually explored for other fragments, and the accumulated secretions were removed by aspiration.

The convalescence of all of the cases was characterized by the continuation of some degree of dyspnea and the production of excessive secretions for from one to several days. In two cases, that of the potato in the trachea and one of the peanut cases, a low tracheotomy was done several hours after the bronchoscopy because of the inability of the patients to expel the thick, tenacious mucous which constantly accumulated, continuing the toxemia and embarrassing the respiration. Following the tracheotomy, the peanut case recovered rapidly and was decannulated on the sixth day. In this case, following the suggestion of Patterson,[2] syrup of ferrous iodid was given to thin the secretions with apparent benefit. In the potato case, it was necessary to aspirate the secretions repeatedly, and on several occasions to remove hard crusts from the trachea and bronchi with forceps. Decannulation was possible on the tenth day, after which recovery was uneventful. The after treatment of the other cases consisted of careful watching until subsidence of the dyspnea and toxemia, the presence in the room of an abundance of fresh air into which was vaporized from time to time some tincture of benzoin, and in some instances the application of an ice bag to the neck. None was discharged until a careful examination of the chest showed the lungs to be aerating normally.

An analysis of the foregoing cases suggests the following conclusions:

(1) The aspiration of vegetable substances, especially by children, produces a much more severe local and systemic reaction than is the case with metallic foreign bodies.

(2) Vegetable foreign bodies are quite apt to remain movable in the trachea with the consequent danger of subglottic impaction and asphyxiation, while the likelihood of their swelling from moisture is often an added menace.

(3) The systematic enlightenment of parents and nurses, as well as misguided friends and strangers, as to the danger of giving peanuts, watermelon and similar substances to young children, would materially reduce the number of these accidents.

(4) While if left untreated, these cases are almost invariably quickly fatal; if subjected to early bronchoscopy, the prognosis is distinctly favorable.

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DISCUSSION (Abstract)

Dr. W. Likely Simpson, Memphis, Tenn.—The cases that have given me the most trouble at removal are the soft foreign bodies, such as an impacted peanut. If the child has bronchitis before the foreign body has gone into the lung, the result will be very much more serious than if he were in normal condition. If the foreign body is broken up and already infected, of course, there will be very different symptoms. If the foreign bodies are soft and have been left in a few days, it is necessary to do a tracheotomy for drainage of the drowned lung.

In the last number of *Laryngoscope*, Kernan reported eight cases that give us a good deal of information. His cases showed no special toxemia. He extracted soft foreign bodies after they had been in for several days, and the patients had very few symptoms, no more than you might have found in the removal of metallic foreign bodies. He said, however, that if this kind of foreign body is left in, the condition is progressive and will actually destroy the lung. He had one case that had been in over twenty-three years, in which the x-ray showed the lung practically not functioning.

Dr. Arthur K. Hoge, Wheeling, W. Va.—The early diagnosis of vegetable foreign bodies in the tracheobronchial tree is doubly important. First, the chances

of fatal outcome are in direct relation to the length of sojourn of the intruder; and second, the shorter the time that has elapsed since the vegetable substance has been inspired the less difficult is the mechanical problem of its removal. These bodies nearly always have a tendency to swell, thus causing a blockage of the bronchi with the attendant drowned lung.

It is highly important and sometimes difficult to remove all the foreign body and carefully to aspirate all of the secretion caused by its irritation.

Since this type is so toxic to the pulmonary tissue, we should try to impress the general practitioner with the fact that the history of the case is of greatest import.

When a healthy child who is normally playing suddenly chokes with or without cyanosis, the possibility of a foreign body should be considered and a careful pulmonary examination should be made. If any pulmonary signs are elicited, a bronchoscopic examination should at once be made. In competent hands this is practically without danger.

The "asthmatoid wheeze" of Jackson, when present, is an extremely valuable sign, as has been mentioned by the author. If the foreign body be obstructive in type, the only signs may be slight dyspnea, associated with either a dull note or hyper-resonance on the affected side, usually combined with decrease in expansion. I have found that cough is not a very reliable symptom. In the very early stage the x-ray is of little value, since it will not cast a shadow of this type of foreign body. However, a little later, when the secretions have begun to fill the bronchi, the x-ray is of definite aid, since many times it is possible to obtain a shadow upon the plate which shows practically all the ramifications of the bronchi below the point of obstruction. A positive x-ray finding is of value, while a negative report is valueless. The history as to the nature of the foreign body is many times without value, so an x-ray should be made in as many cases as possible before bronchoscopy is attempted.

A large number of cases of fatal pneumonia result from failure to consider the possibility of a foreign body in the lung.

Dr. Murdock Equen, Atlanta, Ga.—Until the advent of the bronchoscope and esophagoscope, very little attention was paid to the presence of a foreign body in either the bronchi or in the lungs. The old method, as used by Dr. Bruening, was to perform a tracheotomy and then pass the instrument through the tracheal wound. Dr. Bruening thought the advantage of that was that it placed him closer to the foreign body. Dr. Jackson devised the use of a much longer tube with a very small lumen, and with this he was able, by throwing the head back, to pass the bronchoscope within the trachea without performing a tracheotomy. Of course, the advantage of this procedure is well known. The bronchoscope requires skilled assistants. The rapidity with which the foreign body is removed, of course, is very important, because the child is toxic and every moment counts. Another thing of advantage in these cases is to have the patient in a horizontal position, because otherwise the foreign body may be coughed up, lodge within the glottis and cause suffocation.

Anesthesia is certainly not desirable, especially if there is much lung involvement. We put the children in a tight sheet much like that which we use when incubating for diphtheria, and with proper assistance can usually remove the foreign body without accident.

The x-ray is of value, because it shows the position of the diaphragm and the amount of air going into each portion of the lungs, and often definite pathological conditions. If the foreign body is metallic, the x-ray is immediately valuable. Much dyspnea may result from a foreign body in the esophagus.

Dr. W. G. Harrison, Birmingham, Ala.—While reading this paper two things impressed me definitely:

First, a physician should not try to do this class of work unless he is thoroughly trained and knows himself possessed of the best skill available. The first time I saw Dr. Stiles do bronchoscopic work I realized that he did it much more smoothly than I, and so I have not tried it since. As a rule, there is some one man in a city who can do this better than anyone else. The technic is delicate and difficult, and it is only right that the cases should be referred to the man who has the best training and skill.

My second idea was this: most people believe that a vegetable substance will dissolve in the "juices" of the trachea and it is not so necessary to remove these as in cases of metal, but this is a great mistake. Dr. Jackson definitely demonstrated and Dr. Stiles has emphasized that the metallic foreign body is less dangerous, so far as producing pneumonia is concerned, than vegetable substances. We ought to educate our physicians to realize that it is more necessary to remove a peanut than a bullet, and a grain of corn than a button.

Dr. Robert C. Lynch, New Orleans, La.—The long list of symptoms for the diagnosis of foreign body is usually confusing to the practitioner. I try to preach that if there is a history of the ingestion or inhalation of a foreign body, that is sufficient reason for a bronchoscopy. So whether the patient has asthmatic breathing or bloody expectorations does not make any difference.

In my experience, the more complete the block, the less the secretions. In other words, if a bronchus is filled tightly there will be less evidence of tracheo-bronchial-edema above the point of the block by the foreign body, but there will be more secretion pent up below the foreign body. It is just as essential to remove this after the foreign body is out as it is to remove the foreign body, because if you do not, this pent up secretion will not only flood the lung on the side of the lodgment of the foreign body but on the other side, and you will have post-operative drowning.

A point upon which I differ with Dr. Jackson, and have differed with him from the start and upon which I still differ with him, is anesthesia. I anesthetize every case whether he is coughing or has temperature or not. The only contra-indication in my work to anesthesia is cyanosis. If the patient is cyanosed and is using his external muscles of respiration to keep himself going, then anesthesia is contra-indicated, but that is the only contra-indication to anesthesia. And in correlation with this statement, I am not able to report to you an instance where I can blame the anesthesia for the death of the patient during the subsequent conduct of the case or the convalescence, but I have been the witness of six instances in which I am quite sure that if the patient had had an anesthetic the outcome of the situation would have been entirely different. In other words, the lack of anesthesia was the means of producing so much trauma at the hands of the operator, and exhaustion of the patient by the attempt to keep him in place and keep him still, that the exhaustion following and the shock caused by the trauma to the tissue ended fatally in

these six instances. This has been my experience over the last few years.

I want to ask Dr. Mosher to say a word about his tracheotomy in case of secretion. Where a child is suffering from an acute edematous tracheo-bronchitis, the result of foreign body, whether vegetable or not, he does a tracheotomy in the usual way, suspends the isthmus in the thyroid and sutures it to the skin, and then he makes a cross-cut on the anterior wall of the trachea which cuts out the four corners. In other words, he converts a slot into a hole and allows the patient to go back to the room without a tube. Then when the patient coughs, the secretions come out and down the neck, and there is no danger of the tube's closing. He tells me that his experience is that this has markedly hastened the time of the reduction of the edema in the tracheo-bronchial tree and the patient need not get used to the tube.

Dr. Stiles (closing).—There is a further point I would like to mention in closing. Many of these patients run some risk of immediate asphyxiation from impaction of the foreign body in the subglottic region while coughing. When possible, they should be accompanied by someone prepared to do an immediate tracheotomy should the necessity arise before bronchoscopic treatment becomes available.

EPENDYMAL NEOPLASM OF THE MEDIAN NERVE, WITH CASE REPORT*†

By JOHN A. LANFORD, M.D.,
and
ISIDORE COHN, M.D.,
New Orleans, La.

Neoplasms of nerve trunks are not particularly rare, but they are far less common than neoplasms of the central nervous system, while cutaneous neuro-fibromata are one of the most frequent forms of benign tumors. We therefore feel that the recording of this case will prove interesting and instructive, especially as it presents a histology hitherto undescribed in a tumor arising in such a location.

Mr. J. C., age 35 years, complained of pain in the right shoulder extending down to his hand for the preceding six months. The patient stated that the pain followed a sudden strain in the raising of sacks of flour.

Following the accident he was not immediately incapacitated. There was no immediate swelling of the arm and no evidence of ecchymosis was noted by him. He said that the pain became progressively more acute and was associated with marked loss of muscle power, evidenced by the inability to raise heavy packages as he was accustomed to do.

The patient presented evidence of von Recklinghausen's disease (multiple neuro-fibromatosis). The right forearm was smaller than the left, and the carrying angle was diminished. There was limitation of extension of the elbow, but no limitation of flexion, pronation or supination. There was marked atrophy of the thenar muscles, as well as the muscles of the palm of the hand. The skin was glossy over the right hand and the fingers showed marked difference in color, with hyperesthesia of the index and middle fingers and thumb. On the inner aspect of the right arm, about two inches above the internal condyle, there was a mass which extended down to the level of the internal condyle and in front of it to a point corresponding to the level of the insertion of the biceps muscle. This mass was hard, tender to the touch but not adherent to the skin. The tumor was slightly movable, did not pulsate and was apparently definitely localized on the inner aspect of the biceps muscle.

He was advised to have the mass removed, as it was our opinion that we were dealing with neuroma of the median nerve. The patient was told that without removal the condition would probably get worse, but it was impossible to assure him that as a result of the operation he would have complete return of muscle power.

Operation, June 12, 1922, was by Dr. Isidore Cohn, with Drs. Woodruff and Lutterloh assisting. The anesthetist was Dr. Algeyer; the anesthetic, ether; preanesthetic hyperdermic, morphin ¼ grain, atrophin 1/150 grain. The anesthetic was started at 10:47 a. m., and discontinued at 12:06. Operation started at 11:00 and was discontinued at 12:12. Operative procedure consisted of excision of the neuroma and transplantation of the median nerve into the ulna nerve in the right arm.

An incision about three and one-half inches long was made on the inner side of the biceps muscle corresponding to the course of the brachial artery. As soon as the soft tissue was dissected away and the muscle retracted, the large mass with the blood vessels came into view. The median nerve was isolated above the level of the tumor and a pair of forceps insinuated between the brachial artery and the median nerve to act as a support. After this the dissection of the tumor, which was continuous with the median nerve, was carried on, and the mass entirely separated from the brachial artery. It was shown to be a spindle-shaped mass about 2.5 inches in its long axis and 0.75 inches transversely. In one place on the outer aspect of the mass it had broken through as though there had been a slight hemorrhage. The lower limit of the tumor was just above the bicipital fascia.

Novocain was injected into the median nerve above the level of the neuroma and a section was made of the nerve above. Then the nerve was sectioned below. This left a distinct gap of about three and one-half inches. It was impossible to consider elongation of the nerve to close the defect and therefore the question of where to graft the distal end was considered. It was decided to utilize the ulna nerve. This was exposed behind the internal condyle and isolated and mobilized. With a pair of forceps, a tunnel was made under the pronator teres. The median nerve, distal end, was brought under the tunnel and grafted into the lateral aspect of the ulna with fine silk. The proximal end of the nerve which was cut instead of being left unattached was sutured to the internal cutaneous which was exposed in the wound. The wound was sutured in tiers with fine catgut to approximate the muscle and subcutaneous tissue. Michel's clips were used for the skin. Gross section of tumor showed that it contained

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†From the Departments of Pathology and Surgery of Tulane University and Touro Infirmary of New Orleans, La.

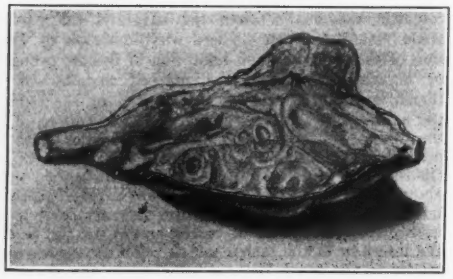

Fig. 1
Median nerve tumor, gross appearance.

a good deal of connective tissue and some degenerating areas which looked like colloidal material. A diagnosis of neuro-myxo-sarcoma was made.

Laboratory Report.—The specimen is a somewhat cylindrical shaped structure measuring 7 cm. in length and 3 cm. at its broadest diameter. It tapers at each extremity, which is seen to be made up of a number of individual cords or fibers held together by an enclosing connective tissue and appears to be a nerve trunk which has been ballooned out by a growth within, causing stretching and in one place rupture of its sheath. It is almost uniform throughout, except about its upper third, where there is a dark reddish brown mass 2 cm. in thickness projecting outward for about 1 cm. beyond the surface of the main growth. The specimen is for the most part of a reddish brown color, with the exception of the protuberance above described, which is somewhat darker. It is quite firm in consistency, but here and there a few nodules can be detected. On sectioning it offers some resistance to the knife and presents a cut surface which is made up entirely of a new growth that has replaced the nerve tissue, the fibers of which are apparent only at each extremity. No nerve bundles are noted on gross study. The cut surface of the main mass is made up of a number of irregular lobulations divided by a stroma into areas of varying sizes and more cellular appearance, resembling gland spaces. It is rather translucent, giving somewhat the appearance of myxomatous type of tissue. Some of these areas appear to be necrosed, as is evidenced by increased friability and a dirty yellow color. It resembles a carcinoma that is growing fairly rapidly. The cut surface of the more rapidly growing mass which appears to have ruptured through the covering membrane of the main growth is uniformly reddish brown and very cellular in appearance. The blood vessels are not prominent (*Figure 1*).

Histologically the tumor on first sight closely resembles a carcinoma, there being noted a number of gland-like spaces cut in several directions, some being circular and others long and rather tortuous, surrounded by a supporting structure of varying character and degrees of density. The larger gland spaces contain an amorphous structureless material. They are lined with cells that are tall and columnar in their general appearance, which are closely packed together, and on close study show practically no separation of the individual cells, giving the appearance of a multi-nucleated syncytial mass, resting on an underlying structure resembling a basement membrane. The entire glandular structure is divided into various sized areas by a very cellular supportive material showing nuclei occupying a relatively large proportion of the cell, there being a minimum amount of inter-cellular substance. Most of the supportive structure is very suggestive of nerve tissue, but we are unable to find where except on periphery positive evilence of a former nerve trunk. Mitotic figures are noted both in the epithelial and supportive cells. The blood supply of the part is not prominent, the vessels being present in the stroma. A few areas of necrosis and degeneration are noted, but these are confined largely to the gland-like spaces. In some places the stroma is myxomatous in character and in others is made up of a denser tissue.

A tentative diagnosis of carcinoma of the gland cell type is made with the explanation that further study is required definitely to determine the primary origin (*Figure 2*).

Progress Notes.—Following the operation the patient had a sensation of pain and touch in the thumb and all fingers. He was able to flex and extend his wrist. Three days after operation common sensation was noted in the peripheral distribution of the median nerve. The wound healed by primary intention. When the patient left the hospital ten days after the operation, common sensation was present as noted above.

During October, 1922, the patient returned, because a painful lump had developed in the upper portion of the previous operation wound. We believed this to be a neuroma of the stump of the median nerve and advised operation.

Operation was performed November 3, 1922, by Dr. Isidore Cohn, with the assistance of Dr. Sneed. The anesthetist was Dr. Baker; the anesthetic, ether; the operative procedure, resection of a recurrent neoplasm.

Operation.—An incision about three inches long was made and the median nerve was exposed above the level of the tumor. The vessels were located and dissected away from the tumor. The nerve was injected with 80 per cent alcohol above the level of the tumor and sectioned. A large vessel in the center of the nerve had to be ligated, as it was not controlled by the injection. The stump was dropped back and the mass carefully dissected from the vessels and removed. The fascia and fat were approximated, after which the skin was closed, using interrupted sutures. The patient experienced very little discomfort and left the hospital two days later.

Fig. 2
Median nerve tumor. Photomicrograph showing gland-like structures and the glia-like supporting tissue.

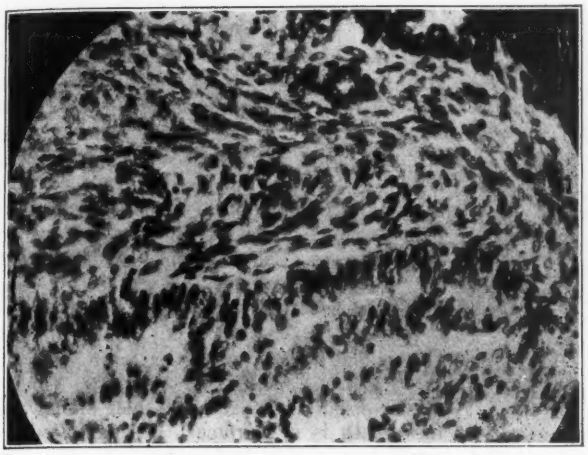

Fig. 3
Median nerve tumor. Photomicrograph of the first recurrence showing similar histology to the primary growth.

Laboratory Report.—A small piece of tissue is seen, measuring 3 by 2 cm. irregular in shape and presenting different degrees of density, one area being quite firm. Its outer surface is pinkish red in color. The cut surface is pinkish gray in color for the most part, but shows here and there a few areas with a dirty yellow necrotic appearance. In one place is noted a more cellular structure which elevated itself above its surroundings when the mass was cut.

Histological study shows a picture similar to the primary growth and a diagnosis of recurrent carcinoma of undetermined origin is made (*Figure 3*).

Progress Notes.—On June 23, 1923, the patient returned because of the development of a mass on the inner aspect of the elbow. Examination at this time revealed the following: The patient was well developed and showed no evidence of emaciation. With the exception of the tumor mass noted at the elbow, nothing in his condition indicated general discomfort. The scar of the previous operation on the right arm was healthy. The elbow was flexed at a right angle. There was little mobility of the joint, and the forearm was midway between pronation and supination. Some atrophy of the muscles of the hand was present, but sensation of pain, touch and temperature in the forearm was undisturbed. However, there was some diminution of sensation in the index finger.

Dr. Holbrook, a neurologist, examined the patient and reported: "Sensation of pin and cotton is good over the palmar surface of the right hand, except in the index finger, in which sensation is dulled about the middle and beyond this point is absent. Thermal sensation is inaccurate over most of the hand, especially toward the index finger. Temperature differences are appreciated toward the center and inner side of the hand."

Operation, January 25, 1923, was by Dr. Isidore Cohn, with Drs. Macheca and Liles assisting. The anesthetist was Dr. Algeyer; the anesthetic, ether, and operation, amputation of the right arm.

Amputation was done at the junction of the middle and upper thirds of the arm. A tourniquet was applied, a circular skin flap dissected up, and the muscle cut at the level of skin retraction. The muscles were retracted and the humerus sawed through. The large nerves were then brought down into the field and an inverted V-shaped excision of the end approximated the sheaths with plain catgut, making a fish tail appearance after the suggestion of Corner. The nerves were injected with 95 per cent alcohol following the suggestion of Carl Hoover and Lewis. The muscles were quilted over with plain catgut after lifting over the large vessels. Chronic catgut No. 2 was used for ligation. There was very little bleeding. Interrupted plain catgut sutures were introduced into the sheath to diminish the amount of dead space. The skin was closed with silkworm and plain catgut interrupted sutures. The specimen was sent to the laboratory for preservation. Amputation was done because the removal of sufficient tissue to remove the entire mass would leave a useless arm.

The gross specimen was from an amputation of the lower third of the arm and forearm; the dissection by Drs. Cohn and Lanford. The line of the previous incision along the course of the ulnar nerve was incised. The skin and fat were retracted. The ulna nerve, prior to its entry into the pronator teres, was exposed and the nerve followed down to a point where it was lost in the tumor mass just above the internal condyle. The skin flap was then dissected away from the muscle, exposing the biceps and the tumor mass, which was covered by the flexor muscle originating from the internal condyle. The brachial artery was then retracted medial to the ulnar side, exposing the median nerve below. We then followed the median nerve to its point of implantation into the ulna by cutting through the pronator teres and palmaris longus muscle bellies. We could see the suture line as evidenced by the black silk which had been used a year ago and was still *in situ*. There was apparently no thickening of the exposed portion of the median nerve on its anastomosis with the ulna. The belly of the flexor sublimis digitorum was ballooned out by the growth and gave the appearance of a funnel. In order to disturb the appearance as little as possible, Dr. Lanford took a small block of the tumor out of the ballooned portion of the palmaris longus belly. This was then sutured in order to retain the contour of the original growth. The specimen is to be preserved; section and photographs are to be made.

Laboratory Report.—The specimen is made up of the forearm and hand and about 6 inches of the arm, which presents a tumor involving the structures at the bend of the elbow. In gross, the hand shows considerable atrophic changes, but otherwise is negative. There is noted a very marked swelling at the bend of the elbow on the anterior surface mostly, extending backward and laterally to involve most of the structures. The overlying skin is intact and loose over the growth, and there is noted a long, well-healed scar of a former operative procedure. On dissecting back the skin we find a new growth that has involved the muscles of the part, particularly all those inserted into the

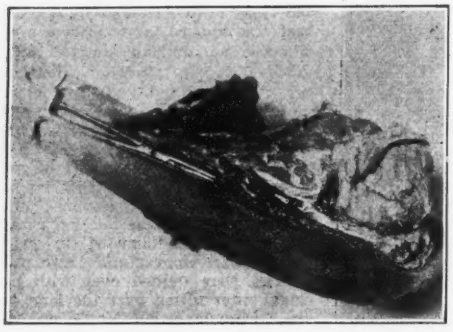

Fig. 4
Median nerve tumor, gross appearance of second recurrence.

internal condyle of the humerus, and to a lesser degree those of the external condyle. The muscles are pushed upward and are thinned out, this being particularly noticeable in the superficial layer, while the deeper layer is more infiltrated and replaced by the main growth itself. The main mass is 11 cm. in length, 8 cm. at its thickest portion, and is roughly cylindrical or funnel-shaped, the upper portion being at the bend of the elbow, and the pointed end extending onto the forearm. It is very firm in consistency, and here and there presents nodulations which are smooth and are firmly adherent to the overlying muscle. On sectioning it offers considerable resistance to the knife and presents a cut surface that is grayish white in color and is apparently made up largely of supportive tissue. The bands of tissue running in all directions give somewhat the appearance of a leiomyoma of the uterus. The blood vessels are not prominent, and only here and there are areas noted which appear to be well supplied with blood. An occasional area on the cut surface is noted which shows degeneration suggestive of a myxomatous or loose mesh-like type of structure containing a clear pinkish stained serum, but no definite lobulation or cystic cavity can be found (*Figure 4*).

Microscopic study shows the mass to be almost uniformly made up of spindle-shaped cells running in bundles in all directions. Some of these strands being considerably older than others tend to separate the more rapidly growing ones into distinct areas. Here and there can be noted little cavities microscopic in size that are lined with a single layer of cells resembling epithelium. The blood vessels are not prominent in the main portion, although here and there a few capillaries are noted. Some of the older portions of the growth show considerable deposition of collagen-like material and still others are somewhat myxomatous in character. Many of the cells are rapidly growing and show mitotic figures. The histology is that of a neurogenic sarcoma, with absence of the gland-like spaces noted in the primary growth (*Figure 5*).

Progress Notes.—June 29, the wound was dressed. There was no swelling. There was primary union. The patient was permitted to go home, but kept under observation for more than a year. His general condition continued good, with no evidence of recurrence or development of the tumor in any other location.

DISCUSSION

Tumors of the peripheral nervous system may arise from the axis cylinder process or from the coverings of this structure. Axis cylinder neoplasms, that is, of true neuroblastic origin, are very rare, and when they do occur are usually in the sympathetic ganglions. We know them under the name of ganglion neuroma or pure neuroma. They are entirely distinct from the neoplasms of the coverings of the cylinders, the representative type of which is a fibromyxoma, which neoplasms are considered of connective tissue origin.

However, Adami[1] quotes Veracoy to prove that the cells of the sheath of Schwann are of neuroblastic origin and that any tumor arising from the sheath is a neuroma. If this is true, we would be forced to include many of the tumors encountered in von Recklinghausen's disease and could find an explanation of the origin of our neoplasm, but our neoplasm did not show the characteristics of a neurogenic sarcoma until two previous growths had been removed.

The gross appearance and histo-pathology of the primary growth and the first recurrence are most unusual in a nerve trunk neoplasm and a careful search of the literature fails to record any mention of a similar tumor. The arrangement is very suggestive of epithelial origin, especially as the most actively growing cells are in glandular form. However, there is no connection with the skin and no epithelial neoplasm in other parts of the body from which this could have been a metastasis and we are forced to conclude that this is a neoplasm primary in the median nerve presenting certain epithelial characteristics but differing from any of the usual forms of carcinoma.

The histology suggests very closely the histology of certain ependymal neoplasms which have been described by various writers, among them being Saxer[2] and Mallory,[3] but all of these neoplasms were in close relation with the central nervous system occurring either in the brain or spinal cord itself, or as in Mallory's case in the tissue over the coccyx. It is therefore necessary to resort to the theory that this neoplasm sprang from a cell which was carried down from the central nervous system in the development of the median nerve, it having its primary origin in the neuro-epiderm of the developing embryo. The histology further resembles the histology of ependymal cells, especially as in some areas can be seen small rudimentary protoplasmic processes similating cilia which are

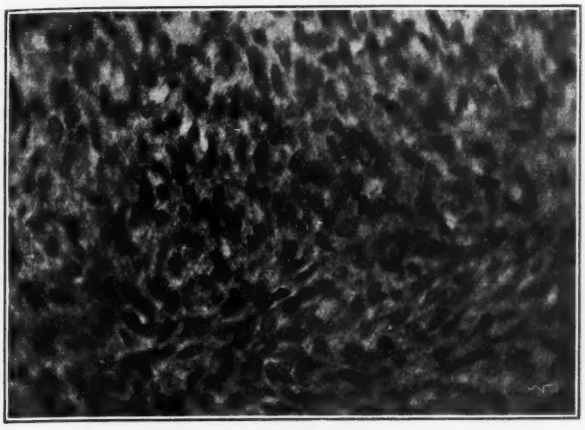

Fig. 5
Median nerve tumor. Photomicrograph which shows histology is only of the supporting element (second recurrence).

present in late embryonal life in the lining of the neuro-canal. Further, the structure shows that the component cells of these gland-like spaces are in many instances not characterized by a single cell but rather by a multi-nucleated syncytial mass. And further, the absence of any secretion in these glands tends to lessen the probability of an ordinary epithelial cell origin.

Hardesty[4] has shown that the cells composing the neural tube are at first individual, but at an early stage lose their boundaries, and the resulting fusion of their protoplasm forms a syncytium. Further, the protoplasm of the syncytium increases more rapidly than the nuclei are distributed, and in consequence there appears at the periphery of the embryonic spinal cord an excrescence of non-nucleated protoplasm which becomes the mantle of the later stages.

The fine threads of the mantle layer increase in size both by a growth of their substance and by a condensation of adjacent threads due to the radial drawing out of the reticulum produced largely by the lateral direction of the growth of the wall of the tube and the radial migration of the nuclei from the ependymal layer toward the periphery. Throughout the lateral wall of the neural tube the nuclei migrate radially from the ependymal layer. It is therefore evident that it is possible for an ependymal cell in early embryonal life to migrate and be caught in the reticulum, which finally becomes a neurone and be carried well beyond the borders of the central nervous system, there to lie dormant until stimulated to activity by some unknown factor, when it would develop into a neoplasm that ultimately would differentiate into a structure characteristic of such an origin, that is, neuroglia and ependyma.

Mallory[5] has proven that an examination of the tissue over the coccyx and sacrum of embryos shows frequently (six out of seven) gland-like structures lined with epithelium which he believes to be the remains of the lower end of the neuro-canal. These cells he believes unquestionably have in consequence of their origin potentialities of differentiating into any type of structure having its origin from an epiblastic cell, among them being ependymal cells and their derivatives (neuroglia). He used that fact to explain a glioma originating over the coccyx of a woman 44 years old, in which were present masses of ependymal cells in a neuroglia matrix.

We are therefore of the opinion that this neoplasm of the median nerve is an ependymal structure containing gland-like spaces, in a neuroglia matrix.

It is an interesting fact that, while the growth in all of its phases showed destructive and infiltrating characteristics and rapidly growing embryonal cells, no metastases had appeared four years after the first operation, and the patient is now in very good health.

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DISCUSSION (Abstract)

Dr. J. C. Bloodgood, Baltimore, Md.—I have seen almost two hundred nerve-sheath tumors, and have never seen epithelial cells in them, whether they were malignant or benign. I must confess that as I looked at the section it reminded me more of my work in embryology a quarter of a century ago. I am familiar with this type of sections in Ewing's book, but I have never seen a case. As to the disappearance of the epithelial element, or the disappearance of one group of cells in a tumor in which there is more than one group, it is quite possible; and the recurrence of one group is quite likely, especially in tumors of the breast. The breast tumor is not unlike a nerve-sheath tumor, as it has in it the glandular tissues of the breast. It was known to the older pathologists that this tumor becomes malignant. In one part of it you may see where the connective tissue is becoming sarcoma, in another carcinoma. I have seen, in patients who came late, re-

curring tumor; and in those final tumors that caused their death there was no evidence of epithelial tissue. Therefore, I can add nothing to the possibility that this may occur in nerve-sheath tumors. It is unusual now for anyone to find a new tumor, but chordomas have been overlooked, and when we went over our cyst walls of the so-called dentigerous cells, in which in the past records we said no evidence of adamantine cells was found, we found in half by going over new sections, evidence that this enamel remained.

Here is a man who lost his arm who ultimately may die of a recurrence. What are we going to do with a tumor on a great nerve trunk? My opinion is that we should leave it alone absolutely, or, when we operate, treat it as though it were most malignant. Perhaps a larger primary operation might have saved the arm. I can recall two cases, one of which was an ulnar nerve tumor in the bend of the elbow. The surgeon cut down on it, because it was painful, and scraped it off the nerve, because he did not want to destroy the nerve. It recurred, and he then did a very wide resection. It recurred again, and he had to do a shoulder-girdle amputation. In another case the tumor is, after three years, the same size as when it was first removed. For years pathologists impressed surgeons that giant cell sarcoma was sarcoma, and they did a great deal of harm. It is the duty of pathologists to call to the attention of their surgical colleagues the danger of attacking these primary tumors of nerve sheaths, that either they should resect very widely or leave them alone. I may say there is only one thing worth dwelling upon in sarcoma: leave an innocent appearing tumor alone, or take it out radically.

Dr. J. Shelton Horsley, Richmond, Va.—I had never seen or heard of such a case as this before. Dr. Lanford was kind enough to send me the slides. It is, as Dr. Bloodgood remarked, not an uncommon thing to find a malignant change in the different elements. As we know, sarcoma may develop in the stroma of a carcinomatous growth, even though the carcinoma may tend to disappear. The theory of the authors as to the origin of the tumor is most ingenious, and I can see no other logical explanation.

Dr. Dean Lewis, Baltimore, Md.—This rare tumor which has just been presented suggests a discussion as to the origin of sheath cells. There is always difficulty in interpreting the significance of cells found some distance from where they usually occur. I believe that Dr. Lanford referred to tumors of this type as originating from ependymal cells. It is interesting to remember that Saxer ascribed much the same origin to interpeduncular cysts of the hypophysis, which we now know originate from islands of mouth epithelium carried back with the craniopharyngeal duct. This is, as has been said, a most unusual tumor, the origin of which is difficult to determine.

Surgeons as a rule seem to be disinclined to sacrifice long segments of nerves in such cases. I should not hesitate to sacrifice a long segment, depending upon mobilization of the segments, to close the gap; or in case it could not be bridged, to be content with the disability, with a lessened probability of recurrence after a resection.

I have never seen a rapid return of epicritic sensation after section of a mixed or cutaneous nerve. We should remember that the area of total anesthesia following nerve section is always less than the area supplied by the nerve involved. There is an area of total anesthesia surrounded by one in which protopathic sensation is found. These are merely the normal findings after nerve section and should never be regarded as evidences of regeneration. Epicritic sensation returns slowly and late and in many instances never recovers completely. Cutaneous sensation must be tested carefully and repeatedly before any conclusion is drawn regarding regeneration.

Dr. Cohn (closing).—Inadvertently and unintentionally the artist did the surgeon an injustice. The idea was not to save the nerves but to sacrifice enough, as we thought, to get rid of the tumor. All of us have profited, probably, by Dr. Bloodgood's teaching that if a tumor looks malignant it should either be removed radically or left alone. That was what we attempted to do.

SOME ASPECTS OF THE PROBLEM OF JOINT TUBERCULOSIS*

By RUSSELL A. HIBBS, M.D.,
New York, N. Y.

The New York Orthopaedic Dispensary and Hospital is particularly well fitted for the long time treatment and study of the individual case of joint tuberculosis. Its Country Branch was established twenty-two years ago, providing a hospital in the country where the individual patient could remain for long periods of time with no interruption in treatment and with every influence of good food, good air, and sunshine utilized in his treatment. After discharge from the Country Branch the follow-up was continued indefinitely through the City Dispensary, so that the observation of such cases is uninterrupted for a long period of years. This would seem to be the only way to obtain any facts that are trustworthy in regard to a disease, the course of which is so long as joint tuberculosis and so frequently recurring after many years of apparent quiescence.

An end result study has been made of seventy-seven cases of knee joint tuberculosis that were treated at the Country Branch and have been under observation for from five to fifteen years.

In 13 per cent of these cases an incorrect diagnosis was made. Of the sixty-seven patients remaining, seven died from other forms of tuberculosis. Forty-three of the knees became quiescent; sixteen again became active, leaving only twenty-seven inactive cases. This term is used advisedly, rather than cured, because as has been found time and again, patients with tuberculosis who were thought to have been

*Read before the Section on Bone and Joint Surgery, Twentieth Annual Meeting, Southern Medical Association, Atlanta, Georgia, November 15-18, 1926.

cured for many years have had recurrences of the old condition. Of the twenty-seven, five have stiff joints; twenty-two have varying degrees of motion, but all with marked limitation and seriously crippled joints, so that the final result of the conservative treatment in thirty-three cases was active disease. Sixteen of them subsequently had a fusion of the knee by operation and have remained free from symptoms. Indeed among the large number who have had this operation and are not included here, not a single case of recurrence has been seen.

The average length of conservative treatment in these seventy-seven cases was six and one-half years, and the average period of observation fifteen years.

The results in the conservative treatment of tuberculosis of the hip at the Country Branch are still worse. From 1904 to 1921, two hundred and eight such cases were treated. Errors in diagnosis were made in forty-six cases (22 per cent), leaving one hundred and sixty-two who probably had tuberculosis. Of this number one hundred and fifty were observed for from three to fifteen years. Thirty-six of this number, or 24 per cent, died. In twenty, death was due to tuberculosis, six from other causes and in six cases the cause of death is unknown. Of the one hundred and fourteen remaining, seventeen are still active; two are quiescent with probably free motion; forty-one are quiescent with very marked limitation of motion, sometimes with only a few degrees, but with varying degrees of deformity. Fifteen patients had relapses after periods of quiescence varying from one to nine years. The average duration of treatment in these one hundred and fourteen cases was seven and three-tenths years. Nine patients had operations for hip fusion after periods of disease varying from seven to twenty-five years. Altogether, more than eighty such operations have been performed and the results in those in which a sufficient time has elapsed to make any judgment possible is a high percentage of cures. More or less the same situation exists in regard to tuberculosis of the spine as well as the ankle. Of course tuberculosis of the joints of the upper extremities has a somewhat better outlook as these joints are not subjected to the traumatism of weight bearing. It is by no means sure, however, that in these joints an absolute cure is ever obtained with mobility. Certainly no such hope may be justified in the weight-bearing joints and those of the spine. It would seem inevitable that this study offers convincing evidence that our conception of the cure of joint tuberculosis must be revised and our methods of diagnosis perfected.

We cannot any longer trust the methods of diagnosis that have been in universal use in the face of seeing such a large percentage of errors, nor is it possible to be guided in the use of methods of treatment based on the study of cases subjected to such errors in diagnosis. Most of the studies made upon the end result in the treatment of the disease are unreliable, not only because of errors in diagnosis, but also because of the failure to observe individual cases over a long period of time, the only means by which the recurrences which are so frequent may be seen. Relapses occur ten, fifteen and twenty years after all treatment has been discontinued and the cases have been classified as cured.

The difficulties of diagnosis in joint tuberculosis, especially early in the disease, are so great and the frequency of error so common, that the exponent of any method of treatment must first prove the pathology by laboratory test and the results by the observation of the individual case over a long period of time before the method can be accepted as a cure. A laboratory test of the condition is not always possible in vertebral tuberculosis, but in these the clinical findings and x-ray pictures, especially in children, are almost conclusive.

The terms "quiescent" and "cured" have been inaccurately used. There can be no doubt that many cases have been classified as quiescent which were not so, and many classified as cured which were not cured. So many so-called quiescent cases have been found at operation to have very active disease, although living comparatively active lives, that thus far we have no trustworthy evidence of inactivity in this disease. Certainly the condition of the general health is no guide. We have observed case after case of hip joint tuberculosis in children at the Country Branch whose general appearance from every point of view was that of robust health, but who showed unmistakably the steady progress of the disease in its destructive effect upon the hip joint. This has occurred in spite of the fact that as has been indicated before, they were subjected to exposure to the sun for about eight months of each year, which brings us to the question of the influence of heliotherapy on joint tuberculosis. There is no evidence yet to prove that heliotherapy has any particular influence upon the progress of the disease, and there is grave danger that the belief that it does

so, which is so generally accepted, may delay the proper study of this disease for another decade.

135 East Thirty-Sixth Street.

DISCUSSION (Abstract)

Dr. Michael Hoke, Atlanta, Ga.—We have had the same experience that the disease has always progressed and been very destructive where the joints were involved. Only recently has it seemed necessary, in order to make an accurate diagnosis, to get tissue out of the knees and tissue out of the hips. With the present knowledge, or rather with the present ignorance about the persistence of the disease, and with the present inability to destroy it, the only way to make these joints trouble-proof is to immobilize by operation and by bone infusion. We must be more accurate in our diagnosis in the future. And particularly in the child, we should try to get an early, not a late, diagnosis.

Dr. R. L. Diveley, Kansas City, Mo.—Admittedly in many cases a definite diagnosis of joint tuberculosis is very hard to make, yet we feel that a definite enough diagnosis can be made to warrant opening the joint for diagnosis and arthrodesing. Too often are we prone to dilly-dally along with the patient, trying to acquiesce to his whims or the whims of the consulting physician or surgeon. In our section of the country the ankylosing of joints is looked upon in the minds of the laity and not a few of the profession, with a great deal of awe and fear.

When a case comes into our clinic with joint disease, we study the joint from every angle and, if a definite diagnosis is impossible, make a tentative diagnosis and the case is observed for a period of time. The minute we feel in our own mind that the joint is definitely of a tuberculous nature, we advise fusion, this being the same method that nature uses in trying to arrest the disease in any part of the body, whether it be the lungs, kidneys or bones.

We feel that fusion is the only method of giving to the joint absolute rest. We have tried and failed with all other methods of immobilization. This fact is borne out conclusively by Dr. Hibbs' pictures.

Dr. W. T. Graham, Richmond, Va.—In tuberculosis of the hips formerly it was discussed whether traction, fixation or splint should be used. I was brought up a good many years ago when fixation and traction were talked.

When Dr. Hibbs meets with us again, I hope the statistics which he will show of his end results will be as promising, as we have every reason to believe now they will be.

Dr. E. G. Brackett, Boston, Mass.—Dr. Hibbs advocates a very definite and extreme position.

Too many times it has been assumed that tuberculosis of the joint was a purely local problem, which required absolute fixation and protection through a long period of years; and that after a satisfactory period of quiescence in the convalescence had been obtained, the cure was complete. Many times the long period of absolute fixation has been harmful rather than beneficial, for in a large number of cases a certain amount of motion, without violence to the joint, is beneficial rather than injurious to tuberculous joints. The practice of complete and long continued fixation is still so prevalent in many parts of the country that Dr. Hibbs' message and the proofs of his statements should do much good.

In the treatment of tuberculosis of joints which has entered the destructive stage, both the surgical and the social factors should be considered. In the treatment of the great number of cases which fill the city hospital's clinics, there can be no reasonable modification of Dr. Hibbs' position. Neither could I criticize the principle of arthrodesis in these cases before this society, for it is only a few years ago that I read a paper advocating early arthrodesis in cases of joint tuberculosis which have passed into the destructive stage. We know that the only safe and permanent cure of joint tuberculosis is ankylosis, and also that the partly ankylosed or fibrous ankylosed tuberculous joint is not a cure, but is a source of danger. The experience of orthopedic surgeons is that these patients, apparently well after a long convalescence, begin their life work, but frequently show a relapse some time later when the stress of life has added the additional strain to the joint. We should always have for the ultimate aim bony union in these cases. I believe, however, it may sometimes be a question at what period in the course of disease we should perform this operation, particularly in children. Many cases of joint tuberculosis in the young are capable of cure when subjected to the proper conditions of environment. It is only recently since the improvement of laboratory methods that we have been able to determine with any degree of accuracy the diagnosis in these early cases, and I question if we are at present justified in submitting the early case to arthrodesis, except in those cases in which the proper treatment cannot be carried out. Hygiene, fresh air and time are essential factors which cannot always be provided, particularly in the city clinics. It is only in regard to this question that I take issue with Dr. Hibbs in his presentation of the subject, for it is in these that the social features may play an important part in making the decision.

Dr. J. Albert Key, St. Louis, Mo.—Dr. Hibbs has shown us first that in orthopedic surgery we cannot always make an exact diagnosis. I think most of us are guilty of being hit or miss in some of our diagnoses. Gradually we shall adopt the view that we have no right to fuse a joint without an exact diagnosis.

Secondly, he has shown us that it is the duty and the main excuse of an orthopedic surgeon for being a specialist, that he think clearly of the end result of the disease. He should not relieve the patient's symptoms and send him home or have him go somewhere else, but should consider, if this patient live to a ripe old age, what kind of a disability will he have in the intervening years?

It is rather unusual for a man to have so great a part as Dr. Hibbs has had in revolutionizing the treatment of an important condition. He has insisted that ankylosis is the only cure for joint tuberculosis, and has devised methods of ankylosing the three most important joints, the knee, the hip and the spine, original methods which have been proven and than which we have no better operations today.

SURGERY OF GOITER*

By WILLIAM D. HAGGARD, M.D.,
Nashville, Tenn.

Three typical goiter patients have been very kindly brought here by Dr. Waits. He also had two cases of very outspoken, frank, exophthalmic goiter, but they essayed to have their goiters cured by Christian science. I have always thought that would be a splendid thing for those who have unstable nervous systems, emotional and some neuropathic conditions, but very inadequate for a man with a broken leg, gallstones or a tumor that is prone to become malignant.

ADOLESCENT GOITER

This first patient is seventeen years old and has an adolescent goiter. She is taking her course of training at Wesley Hospital, and says that she first noticed the goiter when she was about twelve years old. It did not assume any considerable proportions until about a year ago when her friends noticed it. She is not well, and she is not sick, but she is not as God made her. She has this goiter and wants to know what to do about it. Very properly, I think, the goiter of adolescence is not surgical. It is the type of gland that gets well, as Dr. Mayo said, with treatment, without treatment, and in spite of treatment. They do well on iodin, because we now recognize that goiter is an iodin deficiency disease; that it occurs more frequently in the region around the Great Lakes, where the terrain has been leched of its iodin. The same may be said of the districts in Oregon, where so many goiter cases were observed during the selective service examinations during the War, and in Switzerland, where the men get out of army service because of goiter, and take iodin and cure it.

This girl has very properly been put on Lugol's solution. It will no doubt cure her. Very few cases should be regarded as surgical before they are twenty.

The best way to palpate a goiterous thyroid is that described by Lahey, of Boston. Ordinarily we palpate it with the fingers flat on each side of the throat and ask the patient to swallow as we palpate, but if we place the fingers behind the gland and displace the trachea and thyroid laterally it lifts the lobe free and it can be grasped between the fingers of the examining hand. In this manner (demonstrating) one can easily determine the size of the growth. The same thing can be done on the opposite side. The right lobe is always larger and is the one more frequently involved.

This girl shows no exophthalmos, rapid heart, tremor or general symptoms, and will do well under iodin. The gland is a most important structure, and should never be removed without definite indications of demonstrable disease.

Which type of adolescent goiter will go on and form a large tumor? It is the multiple tumor gland that will continue to grow. Iodin will shrink the size of the gland by removing excess colloid, but will have little effect upon encapsulated adenomata. If it is a single adenoma that remains and persists, one can remove it from the right or left lobe, or from its usual central position in the front of the neck almost as easily as one can hull out a tangerine. If it is multiple, one can remove most of the diseased lobe without much difficulty.

Goiter should be almost entirely eliminated in this country. Below the Mason and Dixon line, it is sporadic. Around the Great Lakes, it is almost endemic. Marine and others made an experiment in Akron, Ohio, of giving about two drams of sodium iodid to approximately two thousand school girls every spring and fall. Of that group only two developed goiter, while out of another group of two thousand untreated two hundred and ninety-five developed goiter. Table salt is so purified that most of the iodin is removed. Some of the manufacturers are now putting back the normal amount. In some states laws have been passed making this a requirement. In Switzerland, where cretinism is the curse of the land and goiter is prevalent, they have made it a rule to give about five drams of iodin per week to school children and in that way have prevented goiter in 95 per cent of the individuals so treated. Formerly it was unusual in some sections of Switzerland to see anyone who did not have goiter.

Adenoma, as a rule, gives rise to few symptoms at first, and except that it is a deformity and nuisance when large, does not make the patient feel the need of an operation. Unfortunately, however, multiple adenomata of the thyroid in the middle-aged develop toxic symptoms in about one out of five instances. According to Plummer, they do this at an average age of forty-two. While it is non-toxic, the plain, ordinary, garden variety of goiter is easily removed and cured, and the question arises, what does it profit a woman to carry around a growth that has a 20 per cent likelihood of developing toxic symptoms? If a patient develops heart symptoms, which is not an unusual incident, if she complains of palpitation, dyspnea or nervousness, we are prone to treat her for these symptoms. If we discover a goiter, the patient says, "I have had that for ten or fifteen years." We must always be on the lookout when a patient has any cardiac or nephritic disorder and show cause why this is not due to the toxicity of the goiter.

Why do these patients develop toxicity? We do not know. Probably the crowding out of

*Clinic, General Clinic Session, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

normal thyroid function by the new growths stimulates thyroid secretion, which is in danger of being annihilated; and in its effort at self-protection, the thyroid is over-activated and hyperthyroidism is produced. We are prone to regard these cases as innocent, non-toxic goiters, but they are potentially toxic adenomas if allowed to remain a number of years. They are most invidious and insidious and, curiously enough, the toxin manifests itself in the heart muscle, whereas in frank exophthalmic goiter it spends itself on the nervous system. In toxic goiter we have a pure hyperthyroidism, while in the exophthalmic variety we have a dysthyroidism. It is presumed that the active principle thyroxin is deficient in the iodin radical. If we give these patients iodin, it will replace this molecule, and the patient will be temporarily better but not cured.

Plummer has done a wonderful thing in discovering the value of iodin in preparing patients for operation, but the iodin is not a cure for exophthalmic goiter. Patients in such bad condition that they have a crisis, with rapid pulse rate, attacks of vomiting and diarrhea, accompanied with great prostration, so that they often die, can be rescued from this condition by the administration of large doses of Lugol's solution. The high metabolic rate will drop from plus 80 to plus 30 in a week, but if one continues to give it indefinitely, it loses its usefulness and it is difficult to get the patient to respond to the iodin as well as she did at the first administration.

Toxic adenoma thyroid 36 years' duration. Toxic symptoms eight months following influenzal infection. Basal metabolic rate plus 20 per cent. Pulse 120.

TOXIC ADENOMA

Case 2.—The next patient has a toxic adenoma. She is now thirty-two and has had the goiter since she was twenty. It is a frank, definitely palpable nodule of the right lobe. It is smooth, glandular, and partly cystic. It is perfectly obvious that it is attached to the trachea on the right, as it can be seen as well as felt to move when she swallows.

She is apparently quite well, but during the last few months she has developed symptoms which are recorded as follows: She has some nervous depression, dyspnea on exertion and an excessive appetite. Her weight is unchanged. The most troublesome symptoms are the nervousness, weakness, headache and a sense of pressure in the neck. She has a fine tremor of the hands. The pulse rate is 100, blood pressure 100/60, the metabolic rate plus 13. This indicates that she is gradually developing the toxic symptoms, and they will, in all probability, become more and more severe. We regard such a case as the most favorable type for operation.

Toxic adenoma does not tend to get well of itself. It is not benefited, but harmed by iodin. Medical and x-ray treatment are futile in giving any real or lasting benefit. The goiters are safely and promptly cured regularly by subtotal thyroidectomy. It is like an attack of acute appendicitis in that it is surgical. Why wait because the symptoms are mild? Delay is the greatest danger of the condition. The goiter can readily be too severe for safe surgery, but is never too mild symptomatically provided it is genuinely toxic. The operation is very simple and can be done easily under local anesthesia without much difficulty.

EXOPHTHALMIC GOITER

Case 3.—This next type, exophthalmic goiter is the *bete noir* of the profession. This patient (presenting patient) has a pain in the back of the neck that she is not quite able to explain, nor am I. To show you how it worries her, I will read you the little clipping which she gave me out of her purse: "Sneezing causes patient to dislocate bone in neck." The clipping says that the woman dislocated some vertebrae from sneezing, and I would say that it was a big sneeze.

Exophthalmic goiter, after all, is a serious problem. It becomes body-wide. I know of no pathological condition in all medicine that is more intricate and complicated, and no class of patients who are more in need of careful surgical management, or who are more grateful for relief than the exophthalmics.

This young lady is twenty-three. Her grandmother had a goiter. At the age of seventeen she had what was called a "nervous breakdown." Her goiter appeared when she was about thirteen and a half years

old. It seemed to be larger at the time of her menses. She had attacks of palpitation and of nervousness; she has experienced hot flushes, but has no depression or dizziness and no dyspnea on exertion. Sweating was profuse. She had nausea and vomiting and diarrhea that lasted a month. The administration of thyroid extract seemed to make her worse. Her pulse rate was high and her appetite excessive. The most troublesome features were the nervousness, palpitation and later attacks of dyspnea.

After ten days' rest in the hospital, a ligation of the superior pole, first of the right and then of the left, was made under local anesthesia by the late lamented Dr. Ed Jones. She had a sharp reaction, but afterward made definite improvement, and the pulse rate dropped rapidly.

She has been examined thoroughly for focal infection and her tonsils have been removed. This was done after the ligation was performed, and later the gland was removed in two stages.

At present her pulse is 80 and she has no tremor. Kocher's symptom of lagging of the lower lid on looking up, Von Graefe's symptom of lagging of the upper lid on looking down, and Stellwag's sign are present. She still has some exophthalmos. That is the last symptom to disappear. She has not Moebius' sign of diplopia on near vision, and she is now almost well. She has had a stormy time of it, but her case has been gratifying in its successful outcome in spite of its being necessary to do the graduated operation to render it safe.

This is the type of case in which multiple operations were formerly done: first a right-sided ligation of the superior pole and then a left-sided ligation after five or six days. We would then wait for two months and allow the patient to gain weight and improve considerably, and then remove the thyroid with safety. This young woman has had four operations, counting the ligations. By their scars ye shall know them. With the use of iodin we rarely have to do the ligation now. We can secure about as much benefit from ten or fifteen drops of Lugol's solution in grape juice at bedtime over a period of eight or ten days as we can from a single ligation. The pulse rate will decrease, the tremor will disappear and the metabolic rate will drop. A rate of plus 78 per cent will often drop under iodin and rest to plus 48 in less than a fortnight. Then, on the crest of the wave, we can do the operation of temporary improvement better than we ever can again. This patient was operated upon first six years ago, and we did not know of the value of iodin as an immediate preparation in such cases.

Exophthalmic goiter. Complete dislocation of eyeball. Cured by replacement, temporary suture of lids and thyroidectomy. (From British Medical Journal.)

Kocher warned us that patients taking iodin for a long time for ordinary adenomatous goiter frequently developed toxic symptoms. This syndrome was called "iodin Basedow." We got away from iodin altogether for a long time except in the cases of school girls, and we should stay away from it now altogether, except that we may use it for a short time in the preparation of cases of Basedow's diseases (exophthalmic goiter) for operation.

Plummer said he used to have about fifteen "medical" deaths a year in patients with crises who were brought in *in extremis*. By giving Lugol's solution in large doses (50 to 100 minims a day) these desperate cases can be rescued from impending death so miraculously that one death a year occurs in this group, where they formerly had fifteen at the Mayo Clinic. This is a real life-saving expedient.

Iodin cannot be used over long periods as a means of medical treatment without losing its effect. After the primary improvement occurs, the basal metabolic rate begins to climb back again and rarely, if ever, can the patient be gotten into as good condition as the first exhibition of iodin brought about. If a patient is drugged repeatedly or over long periods with iodin in the fatuous hope of cure, the surgeon is stopped from getting the benefit that iodin would then be to the patient. It should be given for a week or ten days and then the patient should be operated upon. It is better to do four operations and have a living patient than to do one operation and lose the patient, but by giving the iodin we can avoid the multiple operation, and get the patient in splendid condition for operation, and perform it with a very low mortality and a very high hope of entire and complete cure, if severe injury to the heart and blood vessels have not been invited by neglect and delay.

EYE CONTRA-INDICATIONS IN THE ARSENICAL TREATMENT OF SYPHILIS*

By OSSIAN H. KING, M.D.,
Hot Springs, Ark.

There are so many phases of this subject to be considered that I shall not cover them all and may not even be able to mention some of them. I wish to review the signs of arsenic poisoning, as revealed by certain eye changes due to the administration of arsenicals in the treatment of syphilis.

It is realized that there are certain eye diseases found in syphilitics which are extremely difficult to differentiate from eye changes that might result from the use of arsenicals in the treatment of this disease.

The fact that the eye may be affected in syphilis was revealed by some of the earliest medical writers. But not until the advent of the ophthalmoscope was there any knowledge of the intraocular changes that might take place in this disease. Since Hutchinson first gave the result of his studies in this field, much has been said and written upon the eye changes in syphilis. Ophthalmic evidence of the presence of a syphilitic infection in the unsuspecting patient has been found so often that it has taught us always to be on the lookout. In many cases the only clinical sign of a syphilitic infection is visible to the oculist.

As the knowledge of syphilis advanced the therapeutic attack has kept pace and at times has been in the lead. After the discovery of the causative factor a great stimulus was given to the search for a specific. Many drugs were tried and found wanting, while others proved to be of inestimable value.

In the effort to improve the therapeutic attack, Ehrlich began the study of organic arsenicals with the idea of finding a specific poison to which those pathogenic organisms belonging to the class of protozoa would be more susceptible than the cells of the higher organism. He sought a specific drug which might produce an internal disinfection without injury to the host. As a result of much experimentation and research along this line by many different workers, we have the following named arsenicals: arsphenamin, neo-arsphenamin, sulpharsphenamin, silverarsphenamin, and tryparsamid, which are being used more or less successfully in the treatment of syphilis.

Experience with the earlier arsenical compounds revealed certain deleterious effects upon the eye. Studies to determine the cause of this reaction were made by various investigators.[1] [2]

A study of the action of arsenical compounds on the optic tract made by Young and Loevenhart[1] has given us some very interesting findings. They studied the effect from a standpoint of the chemical constitution of the drug as influencing its peculiar action upon the optic tract. They showed that organic arsenicals with an amino, or a substituted amino group in a *para* position to the arsenic, produce optic lesions. Those with the amino, or substituted amino group, in *ortho* or *meta* position to the arsenic produce no optic lesions.

Myers,[2] in 1921, had attributed the untoward action of certain arsenicals upon the optic tract to the fact that the arsenic in the compounds is pentavalent.

Young and Loevenhart[1] found that the valence of the arsenic in certain groups is not the determining factor in the production of optic nerve lesions. However, the valence of the arsenic in certain instances was found to modify the intensity of the action of a given substance on the optic tract. The presence of the amino group in the compound in a *para* position to the arsenic, regardless of valence, was found to be the most important factor in the production of optic nerve lesions.

The arsenical compounds used in the treatment of syphilis appear to fall into two groups as far as the possibility of eye injury is concerned: a less dangerous group to which arsphenamin, neo-arsphenamin, silverarsphenamin and sulpharsphenamin belong; and a more dangerous group including atoxyl and tryparsamid.

Case reports of optic lesions resulting from the use of the arsenicals in the less dangerous group have been hard to find. To the contrary, the reports have been encouraging as far as eye injury is concerned. Steindoreff,[3] after the administration of fifty thousand injections of arsphenamin, says there were few, if any, cases in which optic nerve injury could be honestly laid at the door of the remedy.

Laureret[4] gives the result of six years' experience with arsphenamin treatment, but does not mention eye injury in his report upon the by-effects of arsphenamin and neo-arsphenamin in

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twenty-seven thousand injections to two thousand and eight hundred patients.

Milian[5] reports a case of transient myopia coming on after each injection of neo-arsphenamin. The myopia was due to paralysis of the sympathetic.

Hoppe's[6] investigations show that arsphenamin has only a slight chemical affinity for nerve tissues.

While we are considering the eye changes found as a result of the toxic action of the arsenic, and have mentioned the similarity existing between these changes and those due to the infection, it would not be amiss to state that many of the eye changes due to syphilis can be prevented. The foundation for those eye changes found in late neurosyphilis is laid during the symptomatic stages, or during primary and secondary syphilis. Therefore, I would urge early adequate treatment of early syphilis. Early treatment to be adequate must take into consideration the fact that neurosyphilis can best be treated during the asymptomatic or interstitial stage. Adequate treatment must include intraspinous, intravenous and intramuscular therapy, as indicated by the findings. The interstitial stage of neurosyphilis expresses itself in the findings shown by examination of the spinal fluid, which may show increased pressure, increased cell count, increased globulin test, with usually a slightly positive up to a strongly positive Wassermann. Sometimes the Wassermann may be negative. Eighty per cent of the cases that show early neurosyphilis will never reach the parenchymatous or symptomatic stage, if properly and adequately treated early.

Arguments have been advanced to discountenance the use of the arsphenamins in early syphilis on the ground that they are responsible for an increase in neurosyphilis, with its accompanying eye changes. However, no convincing evidence has appeared to support this view.

Injury to eyesight made unhappily familiar by early experience with atoxyl, and the close relationship existing between atoxyl and tryparsamid, caused much study of the latter arsenical before it was given to the profession at large. With the introduction of tryparsamid came the announcement that the main ill effect is an occasional tendency for the drug to produce optic symptoms.

The biological action of tryparsamid was studied by Brown and Pearce,[7] who found that the drug possesses certain advantages as compared with the other arsenical compounds and that the only risk is the tendency to produce a toxic action upon the optic mechanism. Tryparsamid belongs to that group of organic arsenicals with the amino or substituted amino group in a *para* position to the arsenic. Young and Loevenhart[1] report that this group produces optic lesions.

Due to the eye complications of treatment by tryparsamid, the drug was available at first to clinics and institutions which were able to assume responsibility for the prevention of eye complications, so far as they are preventable.

On the other hand, Lillie[8] found in a series of cases that tryparsamid was not more harmful to the eyes than any form of arsenic used in the treatment of syphilis of the central nervous system. Stokes[9] is of the opinion that the fear of eye complications from the use of tryparsamid is limiting the application of a very important and useful drug.

Tryparsamid is not spirillicidal and therefore has no place in the treatment of early syphilis.

Complete eye examination, including taking of the fields for form and colors, should be made upon all syphilitics previous to the beginning of any form of arsenical treatment and at intervals during the course of the treatment. This is especially true when the arsenical to be used is tryparsamid. The symptoms that contra-indicate the continued use of tryparsamid are divided into two groups: subjective and objective.

Patients showing signs of optic involvement such as contracted fields or abnormal fundi, are more liable to injury by treatment than normal patients. The important signs of adverse action of tryparsamid upon the optic tract are subjective dimness of vision, flickering or shimmering sensations or flashes of light. The objective symptoms are diminution of visual acuity, contraction of fields and changes in the fundi. However, subjective symptoms should be thoroughly investigated for an objective basis, and, if not found, the treatment may be continued, but with caution. The eye complications are most likely to occur during the first course of the treatment, and often after the first few injections. Patients that have successfully completed one course of tryparsamid treatment without eye complications can be given additional courses of the treatment without so much risk to the optic mechanism.

Patient No. 1210 was referred to me on November 16, 1925, for an eye examination. The referring urologist had made an examination of this patient on November 7 with the following findings:

W. E. F., a railway brakeman of 52, was led into his office, complaining of blindness, incontinence, and pain in legs. His family and past history were negative. He had had gonorrhea twenty years previously, but no ulcer. His present illness began one year previously with shooting pains in the legs and incontinence. On November 4, three days before coming to Hot Springs, he received his third intravenous injection of tryparsamid, which was followed by pain in eyes and partial blindness. The physical examination was as follows:

The heart, lungs, liver, spleen, kidneys and abdomen were negative. His blood pressure was 120/72. His average weight about 220 pounds, height 5 feet 11 inches, and general appearance good. Genito-urinary examination showed the penis, scrotum and glands negative, and the prostate enlarged and soft. Laboratory examination showed the urine cloudy, negative to albumin, sugar and casts, and the Wassermann was negative. Spinal puncture was refused. Neurological examination showed the Romberg positive, kneejerks absent, and pupils that did not react to light.

At my examination, November 16, upon questioning this information was obtained. The patient had worked regularly at his occupation until November 4. He had successfully passed the regular railroad eye examination a few months before. Bifocals, with plus .50 sphere for the distant vision correction, had been used by him previous to the attack of blindness. No eye examination was made previous to the beginning of the tryparsamid treatment. He did not use tobacco or alcohol to excess. His vision had improved since November 7 and he was able to get around without being led.

Examination, November 16.—The nose was negative; the sinuses were clear, and the ears, negative. The pupils of the eyes were large and irregular. There was no reaction to light. Tension was normal. Vision in the right eye was 15/40 and in the left 15/50. The patient stated that the large "E" on the chart could be seen more distinctly if he did not look directly at it. The media were clear. The arteries were smaller than normal, and the veins slightly enlarged. There was no sign of retinal hemorrhage. The discs were pale, with distinct outlines, and cupping was not noticeable. The form and color fields for each eye were concentrically contracted with central scotoma. The diagnosis was retrobulbar bilateral neuritis.

Examination November 23.—Vision in the right eye was 15/35; in the left 15/40. The right pupil was smaller than the left. The fundi were found unchanged.

Examination November 30.—Vision in the right eye was 15/25 and left 15/30+1. With patient's correction, +.50 sphere, vision was improved to 15/20+3 in each eye. The fields for form and color were more contracted. Central scotoma could not be demonstrated at this examination, and the fundi remained unchanged.

Examination January 21, 1926.—Vision in the right eye was 15/25 and left 15/65. The right field was smaller than at previous examinations; in the left eye it was not possible to get a definite field for comparison. The pallor of the discs was more pronounced. The vision gradually failed and the patient was very despondent.

Examination March 21, 1926.—The pupils were large and the eyes expressionless. Vision was entirely gone, even light perception was absent. The vessels of the fundus were smaller than at first examination. The discs were white, with four diopters cupping. There was complete bilateral optic atrophy.

This case is reported, because it is believed to be an optic atrophy following retrobulbar neuritis due to the toxic action of the tryparsamid. The paper is not presented with the view of minimizing the value of the arsenicals in the treatment of syphilis, but rather to stress the point that there is some danger to the eyes from the toxic action of the arsenic. Because there is some risk, the eye findings should be taken into consideration in choosing the particular arsenical to be used in our therapeutic attack upon syphilis.

CONCLUSIONS

Complete eye examinations are essential in syphilitics, because the eye changes found as a result of the disease are often difficult to differentiate from changes that may arise as a result of the toxic action of the arsenical used in the treatment of the disease.

From the standpoint of the likelihood to produce toxic action upon optic mechanism, the arsenicals, clinically and biologically, can be divided into a less dangerous and a more dangerous group.

Subjective symptoms should be the signals for immediate testing for objective evidence of injury. When an objective basis is found for the subjective symptoms, treatment should be discontinued for a time.

Diminution of visual acuity, contraction of color fields and changes in the fundus are symptoms that argue for caution when tryparsamid treatment is contemplated.

The risk is increased in tryparsamid treatment when, through lack of cooperation on the part of the patient, routine fields cannot be taken.

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DISCUSSION (Abstract)

Dr. Hiram Woods, Baltimore, Md.—I wish to discuss the arsenicals, particularly tryparsamid, as they concern the man engaged in clinical ophthalmology. Enough

has been discovered and enough harm has been done to make the syphilologist, neurologist and ophthalmologist each conscious of responsibility in his own sphere. If a certain remedy can cure otherwise hopeless cases of neuro-syphilis, the neurologist ought to know about it. If, in its administration, harm can come to the visual apparatus, the ophthalmologist should know the danger signals and the man treating the underlying disease should be guided by his findings. These principles are applicable not alone to one or occasional consultations but throughout the course of treatment.

Among the accepted facts are: (1) that the arsenicals have sometimes a functional or destructive effect on the visual apparatus; (2) some are more destructive than others and have been abandoned; (3) it is through involvement of the optic nerves that trouble comes.

Tryparsamid is the particular arsenical now under study. Its function is to clear up luetic lesions of the cerebrospinal system, and its effects are somewhat analogous to the supposed effects of potassium iodid, upon which reliance has been put for generations. Tryparsamid therapy is applicable in general paresis, tabes, muscular paralyses, and other conditions of luetic origin. *The American Journal of Ophthalmology*, March, 1925, contains an abstract of an article by C. S. Blumenel and Wm. M. Greig upon tryparsamid treatment of cerebral syphilis. Their patients were warned of the dangers to the eyes before tryparsamid was used, or when the patients themselves were paretic, permission was obtained from relatives. Their results were as follows: "Among thirty-five paretics, six died during the course of treatment. Nine were worse after treatment than before. Three of them developed serious eye symptoms. Ten showed no material change following treatment. The remaining ten improved. The results with the fifteen cases of cerebrospinal syphilis were little different. Three patients died during treatment. Six showed no change whatever. Of the remaining six, two showed moderate improvement and four slight improvement."

In the *American Journal of Ophthalmology*, March, 1926, is an abstract of an article of Cady and Alvis which reports the treatment of one hundred and eighty patients with tryparsamid. Only twenty-seven had recognizable disease of the optic tract. They concluded " . . . that the general benefit derived from tryparsamid in patients with normal visual tracts justified its use, as the vision in only 1.3 per cent was apparently injured. Patients with diseased optic tracts are more liable to visual injury, as 37 per cent of the twenty-seven cases were made worse. They consider objective ocular disturbance an indication for discontinuance of tryparsamid for at least one month, after which it may usually be resumed. Fourteen per cent of the cases with ocular involvement were improved; and the authors point out that 62 per cent were either improved or arrested, whereas the rule without treatment is a progressive failure of vision."

These extracts indicate that there is ground for hope for improvement, but it seems to me that is about all. Risks are admittedly present and the percentage of improvement, indefinite as that is, is not large enough to cause very great enthusiasm. In an article upon tryparsamid by Drs. Alan C. Woods and J. Earle Moore (*J. A. M. A.*, June 28, 1924), attention was called to certain symptoms which were divided into subjective and objective, the former (to be obtained only from the patient) included dazzling or dimness of vision, "snow storms" and other such irritative phenomena. Obviously their statements could be of little value. One with even a slight experience in examining paretics soon learns the total unreliability of what they say. The objective signs are such as the examiner can note himself. Here we have intra-ocular changes and central or field visual defects. These are more reliable. The usual alterations in the field consist in concentric narrowing. The ophthalmoscopic changes are what look like primary optic nerve atrophy. These are the only bases of judgment as to the effects of tryparsamid. Outside of finding definite nerve changes before any treatment is instituted, there is nothing to warn us to refrain. So we are forced to the conclusion that these objective symptoms are the only signs of impending harm. Even here, we have to diagnose between a threatened amblyopia from the tryparsamid and an optic nerve atrophy induced by the syphilis. We must add to this the fact that dosage does not seem to enter into the matter. It is susceptibility to arsenic poisoning. I think the conclusion in regard to tryparsamid in Blemenel and Greig's article is justified. " . . . For ourselves we would appraise it as a form of therapeutic dynamite, notable chiefly for its dangers. Its benefits seem few, though, of course, they might be greater with more protracted treatment."

My own observations in tryparsamid therapeutics are limited to a few cases. I observed a number of cases every week over a period of several months in which nothing was uncovered by careful ophthalmoscopic examination, test of central vision and perimetric study. In one case, however, there developed, after several treatments, definite field contractions. In another case, a man 42 years of age, was pronounced by a competent internist free from all trouble except that suggesting a nervous breakdown. Nothing was wrong in the eyes and central vision was normal. Two months later, a spinal fluid Wassermann was positive, and after seven treatments of tryparsamid a rapidly developing toxic blindness appeared, which went on to complete nerve atrophy. The pupillary reaction to light in one eye persisted for some time after total blindness. The third case was observed in the course of routine treatment in my office. A woman, age 42, had paralysis of the right externus muscle. The Wassermann was four-plus. There were absolutely no other symptoms of disease. She developed, after about four months of treatment, a cut in her visual field. Tryparsamid was at once stopped and two weeks later there was some little improvement. In the meantime, the paralysis had largely cleared and diplopia was temporarily less troublesome. In this case the form of ocular involvement was not typical for arsenical poisoning, and may have been a neuro-syphilitic manifestation.

Oculists who see cases of cerebral syphilis and who are familiar with the almost helpless issue of many of them, should move slowly and then only under the guidance of an experienced syphilologist; should make periodical examinations of the eye background and visual fields while the case is under treatment, and should be hopeful of the result but by no means enthusiastically confident.

Dr. J. A. Stucky, Lexington, Ky.—I should like to ask the essayist if he has met with any unfavorable results in intravenous treatment in acute syphilitic involvement of the optic nerve. I have seen in two cases under twenty years of age, blindness result in the affected eye within twenty-four hours after the first intravenous treatment. Whether this was a coincidence or not, the results have made me "gun shy," of advising this method in acute cases. In both instances the

treatment was administered by careful and experienced men after I had told them of the eye condition.

Another case was in a woman over fifty years of age, who consulted me for sore throat and deafness. She had syphilitic erosions of the right tonsil and pillars with a four-plus Wassermann, and some eustachian tube and middle ear involvement, which I attributed to the lesions in the pharynx. In this case I advised pushing the intravenous medication. After the first treatment she lost the hearing in the right ear and remained deaf for several months, the deafness being due to labyrinthin involvement. Hearing gradually returned after the third month and is nearly as good as when I first saw her. This is the first case of labyrinthin disturbance I have seen which apparently resulted from intravenous medication.

Dr. Edward H. Cary, Dallas, Tex.—With very careful selection of the arsenical preparations, there are less toxic effects. For some years I watched the effect of these preparations in a general hospital, for their indiscriminate use in a general hospital is to be expected. I rise now to go on record as a clinician that I cannot recall a single case where the optic nerve has been damaged from the arsenical preparations that have been used.

Dr. H. M. Moore, Thomasville, Ga.—I should like to ask whether preliminary mixed treatment with the iodids and mercury would do away with some of the danger of the arsenical preparations, and also if a smaller initial dose, followed by an increased dose, would obviate some of the danger. I have never seen a case where I thought the eye was injured by the use of arsenic. Practically all the arsenic used in Thomasville is in arsphenamin and neo-arsphenamin.

Dr. S. M. Herron, Jackson, Tenn.—I recently operated for cataract upon a syphilitic. The patient had been probably overtreated with arsenicals for three or four months. In the left eye there was only light perception, that is, the field of vision gave an opaque lens. The right eye had a vision of 20/70 and no fundus trouble was found.

Is it possible that arsenical treatment had anything to do with the primary development of this cataract, or was it merely premature cataract?

Dr. Stewart Lawwill, Chattanooga, Tenn.—I have heard all my life of the dangers to vision of the intravenous use of the arsenicals, but I have unhesitatingly used them in many cases of optic neuritis and have never had any untoward results. The case the doctor reports is a case of tabes which we frequently find before treatment, a case of a complete optic atrophy, and I wonder if it might not have developed regardless of treatment. Perhaps the treatment had little or nothing to do with the sudden attack of optic neuritis which was coincident with his first shot of arsenic.

My opinion is that the arsphenamins may be given without fear in all cases of optic neuritis of syphilitic origin.

Dr. James B. Stanford, Memphis, Tenn.—I remember one patient whose right eye had normal fields and normal vision. His left eye was practically blind from disseminated choroiditis, and the pupils were of the Argyll-Robertson type. Without consulting me, his physician gave him two doses of tryparsamid, and after the second dose his field in the right eye was telescopic and has so remained.

Patients who show any evidence of syphilis in the eyes should not be given tryparsamid at all, and those who have not any ocular symptoms should have their visual acuity examined, fields taken and fundi examined after each dose.

Dr. John H. Burleson, San Antonio, Tex.—The indiscriminate use of arsenical medication by the profession at large is doing harm and has often produced unrecognized ophthalmic changes.

Admitting that arsphenamin has become an indispensable agent in the treatment of ocular lues, there are conditions where its use is contra-indicated. In the presence of Argyll-Robertson pupil, loss of patella reflex, and optic nerve involvement, its use will certainly hasten loss of vision. In this condition it also hastens degeneration of the ganglion cells of the retina. In primary or secondary lues, with involvement of the uveal tract, iritis and keratitis, and in all inflammatory conditions, we get good results. My clinical observations are that it is a dangerous remedy in hereditary cases. I earnestly advocate both a careful physical and fundus examination before arsphenamin is used.

Dr. King (closing).—There have been, I think, cases where the auditory nerve became involved from arsenical treatment, but it would take a little too long to go into that. It is a possibility.

In my paper I mentioned no case where I laid the blame at the door of the arsenicals that I termed the less dangerous, and the case reported was one due, as I thought, to the toxic action of tryparsamid. I wish to bring to your attention again the fact that the arsenicals as a whole are not without danger, although we are using them constantly. The general practitioner should be guided by what help we can give from an ophthalmological standpoint in the treatment of these cases, and in his choice of the drug.

The percentage of cases that may show involvement of the eye in tryparsamid treatment is said to be about eight.

Most of our cases are being treated more or less with a mixed combination of one of the arsenicals, bismuth, mercury and the iodids.

I do not believe that the fundus examination, in any case where there is a possibility of injury to the eye, is all that is necessary. There should be an examination of the field, which gives the only accurate information as to the function of the eye.

The case I reported was a case of tabes. We do not very often see blindness coming on in tabes as rapidly as this. It is usually more gradual. We had, in this case, a definite central scotoma. Of course, we have that sometimes with syphilis, but it does not come on suddenly. This man evidently had had good vision, or he would not have been able to continue his work as a railway brakeman, which requires fairly good vision. He had to pass the regular eye examination required by men who work on trains.

SYPHILIS OF THE URINARY BLADDER WITH REPORT OF SIX CASES*

By B. Weems Turner, M.D., F.A.C.S., Houston, Tex.

The history of syphilis of the urinary bladder antedates the cystoscope and the Wassermann test by many years, but it was not until the general use of both became prevalent that such cases were definitely diagnosed and treated with any degree of accuracy. In a brief but conclusive study of the bibliography, ninety-three cases of syphilis of the urinary bladder are found to have been reported, which goes to prove that the majority of cases have gone unrecognized. A review of our work for thirteen years gives the absolute proof, in my opinion, that we have missed several cases of syphilis of the bladder. During the first seven years of our existence in the medical world in Houston, not one case was diagnosed. During the past six years six cases have been positively diagnosed, treated and relieved. The cases observed have all been tertiary manifestations of the disease: four ulcers and two papillomatous masses with disintegrating processes going on in one. All showed positive Wassermanns, and all but one gave a negative history of syphilis. The symptoms in each case were alike with respect to cystitis, frequency, pain and slow onset. The cases had been treated by one or more physicians for symptoms referable to the bladder, with the result of aggravation of symptoms in each. Tuberculosis or cancer was considered as a tentative diagnosis in all cases.

A brief report of six cases seen in our clinic is presented below:

Case 1.—J. L., age 64, white, male, single, was referred in September, 1920. The chief complaint was retention of urine and hematuria.

The patient frequently had had retention of urine for the preceding four months and had required catheterization. Some trouble with frequent and burning urination for ten years had gradually grown worse. He had been seen by two local physicians recently who told him that he had cancer of the bladder and that nothing could be done for it.

Ten years previously he had a suprapubic cystotomy by a local urologist for ulcer of the bladder and hematuria. This was followed by a slow and stormy convalescence, the patient leaving the hospital after three months.

The venereal history was negative for sore and specific urethritis.

The case was seen in the home. I was called by his family physician for acute retention of urine with copious bleeding which the patient said was precipitated by catheterization for the preceding four days.

Examination revealed a pale man of small stature in great agony. A general physical survey was negative. The abdomen was distended. The bladder was palpated above the symphysis as a hard, nodular, globular mass. An old suprapubic scar was in evidence.

The external genitalia were negative.

Rectal examination revealed the prostate large, soft, globular, boggy, with obliteration of the median furrow. The seminal vesicles were negative.

The patient was catheterized with great difficulty, a woven catheter with Coude tip being used. After 400 c.c. of bloody urine were withdrawn, the patient was still uncomfortable. He was sent to the Baptist Hospital, where he was catheterized every eight hours for twenty-four hours with no relief of the symptoms of hemorrhage and strangury. Suprapubic cystotomy under local anesthesia was done. The bladder walls were thick and edematous, and many old clots were removed. A jagged, solitary ulcer at the base of the bladder was noted, approaching more to the right half of the trigone. The prostate was palpably enlarged and boggy. The question arose as to the type of ulcer present, and since this was our first case of syphilis of the bladder it was not recognized. Routine laboratory work was done with report of a four-plus Wassermann, giving us our clue, but still we thought it was a true malignancy.

Diagnosis was made of carcinoma of the base of the bladder and syphilitic ulcer of the bladder. Under anti-syphilitic treatment the hemorrhage rapidly ceased, the ulcer completely healed, and during the third week a second stage suprapubic prostatectomy was done with uneventful recovery. Cystoscopy the sixth week showed a normal bladder and the patient in good condition, except for a moderate hypertension.

The patient was lost to observation until September, 1926, six years after operation, when he returned with burning and frequent urination. A few dilations of the posterior urethra relieved all of the symptoms.

Case 2.—F. M., age 42, a white married man, a butcher, with one child, appeared for examination in September, 1922.

The chief complaint was of blood in the urine and marked frequency.

The patient had had bladder trouble for about one year, beginning immediately following an operation for suppurative appendicitis, the symptoms being precipitated, he said, by catheterization. He had had irrigations, massages of the prostate, sounds and various remedies which without exception had made his symptoms worse.

There was no history of venereal sore or infection.

General survey showed a robust Italian with a number of abscessed teeth, enlarged heart and mitral systolic murmur. On the abdomen was a large, separated, herniated scar in McBurney's region, the result of an operation. The external genitalia were negative.

Rectal examination showed the prostate to be large, boggy and tender. The seminal vesicles were nodular, firm and small.

Cystoscopy (in Office).—The cystoscope was admitted with difficulty, inducing much pain. Bladder capacity was 100 c.c., and there was marked tenesmus. There was no residual urine. The prostatic ring was edematous but negative for notches of hypertrophy.

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The bladder mucosa was fiery red and edematous. The ureteral orifices were not recognized. A dirty sloughing ulcer appeared over the base of the bladder, covering the region of the left ureteral orifice and the left half of the trigone, with trabeculae over the dome and middle quadrant of the bladder. Examination in detail was impossible on account of the pain complained of by the patient.

Tuberculosis was suspected, but since repeated rechecks of the urine were negative and the Wassermann reaction was four-plus, diagnosis was made of syphilitic ulcer of the bladder, and anti-syphilitic treatment was instituted immediately. The patient's hematuria rapidly cleared, though the frequency, dysuria and small capacity persisted for several weeks. Gradually, however, the symptoms subsided, but the bladder capacity remained small for six months. The patient discontinued treatment and died two years later. The cause of death is unknown.

Case 3.—J. M., age 61, a negro man, was married, and had five children, when we saw him in March, 1922. He was referred for prostatectomy.

His chief complaint was frequent, painful and insufficient urination.

For the preceding two years he had noted at intervals a violent attack of strangury with blood free of clots during and at the close of urination. One week previously he had urinary obstruction and had to be catheterized for three days. He lost considerable blood and was greatly exhausted when he came to me. He had a venereal sore eight years previously which healed by local measures with some medicine by mouth. He had had no treatment since.

General physical survey was not recorded.

Upon abdominal examination the bladder was distended, and a firm, thick, even mass was palpable above the symphysis with marked rigidity and tenderness. The external genitalia were essentially negative. No scars were noted. Rectal examination showed nodular pile areas and a hypertonic sphincter. The prostate was larger than normal and boggy with partial obliteration of the median furrow. In the region of the right seminal vesicle was a broad, nodular, thickened area extending over one-half of the base of the bladder. Examination was very painful.

Cystoscopy.—The cystoscope was admitted with ease, inducing considerable pain. Bladder capacity was 150 c.c., with 4 drams of residual urine. After draining the bladder, the walls could easily be palpated. Many washings were required to clear the media of blood. The prostatic ring was small, contracted, cleft laterally but not anteriorly. The bladder mucosa was fiery red, thick and edematous. The left ureteral orifice was easily recognized. The right was obstructed by a fimbriated, papilloma-like mass of bullae, varying from macules to pedunculated, ulcerated nodules with broad, pearly, opalescent base, the ulcer being about 5 by 7 cm. Considerable sub-trigonal thickening and edema were in evidence, and marked pain and strangury were noted during the examination. A tentative diagnosis was made of papillary carcinoma of the bladder.

The Wassermann was four-plus.

Diagnosis of syphilitic papillomatous degeneration of the bladder was made and anti-syphilitic treatment begun. Within two months all symptoms had been relieved and the patient was voiding normally. He was referred back to his physician for continuation of treatment.

Case 4.—A. G., a negress of 29, was admitted to the City Hospital genito-urinary service in September, 1924. Her chief complaint was frequent, urgent and painful urination.

The trouble had begun about one year before with frequent urination which gradually grew worse until four months before when symptoms became so marked that she sought advice from her local physician. She began to pass shiny, gritty bodies which she said were gravel. At the time of admission to the hospital she urinated almost constantly but was continent. She could not work or rest for bladder irritation.

There was no history of syphilis, and she had never been pregnant.

Examination revealed a young negress, fairly well nourished. General physical survey was not recorded.

Palpation of the abdomen revealed a tender, indurated mass above the symphysis corresponding to the bladder.

Vaginal and cystoscopic examinations were attempted but discontinued on account of pain. One week later cystoscopy under general anesthesia revealed a bladder capacity of 150 c.c. and much debris, requiring several washings to remove mucus and calculous material. The bladder mucosa was reddened with marked edema. Large bullae occurred over the trigone. An ulcer covered the left half of the base of the bladder, the outstanding features of which were its flatness with stellate edges and pearly white appearance. The base was smooth and comparatively clean, and there did not appear to be any undermining of the edges, nor was there the elevation and infiltration which one would expect in carcinoma. Phosphatic incrustation occurred in villus-like masses about the edge of the ulcer. Carcinoma of the bladder was the tentative diagnosis.

The Wassermann reaction was reported four-plus. A diagnosis of syphilitic ulcer of the bladder was made and anti-syphilitic treatment begun. During the fifth week of treatment cystoscopy was done with but little pain to the patient. The bladder capacity was 240 c.c. The mucosa was clean and the ulcer had healed; some congestion remained. The symptoms had entirely subsided. It was advised that treatment be continued over the usual period.

Case 5.—F. C., age 51, a white widow, was admitted in March, 1925, to the genito-urinary service of the City Hospital. Her chief complaint was constant bladder distress with frequency and urgency of urination. She had had some bladder trouble for ten years and a hysterectomy nine years previously for uterine tumor, since which time her symptoms had gradually grown worse. She was never comfortable and the bladder was very weak, she said. The capacity was growing smaller all the time, and the patient's rest and sleep were constantly disturbed.

She gave no history of syphilis, and had never been pregnant.

Examination revealed a woman of small, slender stature, appearing older than her years. Her apparent age was sixty. General physical survey was not recorded. The abdomen showed a scar in the suprapubic and McBurney regions. Palpation over the symphysis induced pain. The bladder was palpated under the symphysis. In the external genitalia, atrophy of the labia with mild kraurosis of the vulva was noted. Bimanual examination, which was very painful, revealed absence of the uterus and adnexa. A band-like

constriction appeared in the adnexal region, rigidly holding the base of the bladder up.

Cystoscopy was done under spinal anesthesia. The bladder capacity was 100 c.c. It was a small spheroid bladder with a narrow trigone. There were small trabeculae throughout the dome in the middle quadrant. The vesical orifice was round and smooth. The vesical mucosa was generally red. A granular, flat-topped, plateau-like ulcer presented itself, extending from the inter-ureteric ridge about midway to the posterior inferior quadrant of the bladder, with pearly, opalescent bullae about the edges, rather significant of syphilis, this really being the only case in which a tentative diagnosis of syphilis was made.

The Wassermann was reported negative. In accordance with our suspicions, the test was repeated and found to be four-plus. Diagnosis of syphilitic ulcer of the bladder was made and anti-syphilitic treatment instituted. Within three weeks the patient left the hospital feeling greatly relieved, and after two months all symptoms were relieved except the small bladder capacity. The patient was referred to the Department of Syphilis for continuation of treatment.

Case 6.—F. L., age 56, a negro man, was married, and had one child. He was referred in July, 1925. The chief complaints were blood in the urine and weakness. His trouble had begun eighteen months before after lifting, as painless, bloody urination. The condition grew worse under treatment, but after rest in bed gradually subsided. Hematuria and frequency had returned several times within the preceding year, but had grown decidedly worse during the preceding three weeks and clots of blood had almost stopped the passage of urine. He had lost considerable blood and felt weak and depressed, having lost constantly in weight and strength. He had had marked backache and pain in the right hip for the previous week. He gave no history of sore or infection, or of operations. He had always been fairly healthy.

General survey revealed a negro man of medium stature, showing evidence of emaciation and weakness. The mucous membranes were pale and the skin was dry and pasty.

Palpation of the lower abdomen revealed the bladder to be palpably enlarged, indurated and tender.

The external genitalia were negative. Rectal examination showed the prostate to be small and negative. The seminal vesicles were negative.

Cystoscopy Under Spinal Anesthesia.—The cystoscope met resistance in the posterior urethra. The bladder was filled with clots, requiring the use of a clot evacuator to clear the cavity. The bladder capacity was 200 c.c. The prostatic ring was clear, free of notching, with some contraction. The bladder mucosa was everywhere red and edematous, with trabeculae occurring in the dome and posterior inferior surfaces. Covering the left ureteral orifice and ridge was a papillomatous, flat-based, opalescent tumor, jagged and bleeding freely at the lower edge. The tumor was well demarcated and surrounded by opalescent bullae. The right ureteral orifice was rounded and bloody urine was spurting. A No. 7 catheter was admitted with ease to the renal pelvis. The urine was very bloody. One per cent silver nitrate was used to flush the pelvis. The tumor mass was fulgurated massively. A tentative diagnosis was made of papillary carcinoma of the bladder and papillomata of the right renal pelvis.

The Wassermann reaction was four-plus; the hemoglobin 35 per cent, Newcomer method; erythrocytes were 2,700,000, and leucocytes, 52,000. Phenolsulfonephthalein appearance time in the urine was six minutes; total for two hours, 59.8 per cent.

For one week the patient was observed and his symptoms were exaggerated daily. Anti-syphilitic treatment was instituted and he improved immediately. Three weeks after anti-syphilitic treatment was instituted, the hemoglobin was 45 per cent and erythrocyte count 3,250,000. Hematuria had stopped and the patient felt much improved in every way. Cystoscopy three months later revealed the mass to be entirely healed and all symptoms clear.

Treatment was discontinued by the patient after six months and he was lost sight of until October, 1926, when he returned with the same symptoms formerly noted: hematuria, painful obstructed urination, marked pallor and weakness. Cystoscopy showed pearly papillomata in groups of four or five over the left ureter, much smaller than those formerly noted, with hemorrhage from the right kidney. The Wassermann was again four-plus. The patient is at present under active treatment and is slowly improving.

Primary and secondary syphilitic manifestations in the bladder are as a rule comparatively insignificant, and for that reason routine examination to determine the exact significant features of the stages has not been done. They vary, however, from a generalized reddening of the mucosa to a discrete, macular or petechial reddening which readily clears under treatment of the disease. Vesical gummata are among the rare syphilitic manifestations, and as a rule are probably not recognized unless ulceration with secondary infection and hemorrhage directs our attention to the bladder.

The characteristic pathological finding of syphilis of the bladder in its tertiary manifestations is a true cystitis, with thickening of the entire wall of the bladder with resultant contracture and reduction in its capacity. The lesions more frequently appear at the base of the bladder, usually some portion of the trigone, and it is believed that this predilection possibly arises from the location of the lymph glands and glandular tissue in that region. Given a lesion in the bladder, the differential diagnosis is to be made between elusive ulcer, papillomata, carcinoma, tuberculosis and sarcoma. It is not possible to make an absolute diagnosis with the cystoscope alone, but certain characteristics are fairly significant and warrant seeking other evidences of the disease. Among these are generalized thickened, reddened mucosa with macules distributed at the base, pearly, opalescent papules occurring as bullae adjacent to the ulcer or papillomata, with an absence of the typical elevation and infiltration seen in malignancy.

It seems, from a review of the literature and observation of our cases, that syphilis is not a

factor in the production of papillomata, although two of our cases showed definite papillomata, with papillary vegetations co-existing with the bladder lesion. It is also quite evident that malignancy can be engrafted upon a syphilitic lesion of the bladder, as I feel sure that *Case 6* reported by us showed evidence of malignant degeneration in the papillomatous mass which in turn yielded to massive fulguration and anti-syphilitic treatment.

A survey of the six cases above reported reveals the following factors:

Cystitis	6
Peri-cystitis	6
Contracted bladder	6
Hematuria	5
Pyuria	3
Papillomata	2
Ulcer, single	4
Ulcer, multiple	0
Gummata	0
Wassermann reaction, positive	6
History, positive	1
History, negative	5
Anemia, marked	6
Pyelonephritis, hemorrhagic	1

Since some of our foremost men in the past have considered syphilis of the *vesica urinaria* as extremely uncommon, naturally our records bear no relation to the true status. Some prominent authors in the past have doubted that any syphilitic lesion ever existed in the bladder. As late as 1907, Nitze insisted that a syphilitic process had never been found with a cystoscope.

I am reporting these cases to be added to the list and am positive, in retrospect, that several other cases have escaped our diagnostic acumen.

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THE DIAGNOSIS AND MANAGEMENT OF SUPRA-CONDYLAR FRACTURES OF THE HUMERUS*

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For a correct understanding of the different types of fracture of the humerus at or near the elbow, one must keep constantly in mind not only the anatomical structure of the parts entering into the formation of the joint but also his knowledge of the development of the bones, in some instances from numerous centers of ossification or epiphyses, which, as ossification proceeds, unite with one another to form a major epiphysis of the long bone that ultimately unites with the diaphysis forming a complete and continuous bone.

The bones forming the elbow present about the joint six centers of ossification, of which four enter into the formation of the lower end of the humerus. These centers in their order of appearance are: (1) the capitellum, (2) internal epicondyle, (3) trochlea, and (4) external

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epicondyle. The first of these appears by the end of the second year and is followed by the second by the end of the fifth year, while the third and fourth appear from about the twelfth to the fourteenth year.

That the external epicondyle develops regularly by a separate center is disputed by some who claim that a separate center at this location is the exception rather than the rule (Cohn). My own observations have been that it is certainly very often absent. By the thirteenth year both centers entering into the formation of the articular surface of the joint have fused with each other, and together with the external epicondyle, if it is present, make up the lower epiphysis of the humerus.

By the end of the twenty-second year the epiphyseal cartilages have been entirely replaced by firm bone, and bony union with the diaphysis is complete, except that the internal epicondyle may persist as a separate bone throughout life. In this case the surface proximal to the diaphysis becomes eburnated and sometimes forms a distinct joint. It is clear that after complete ossific union the term "separation of the epiphysis," conveying as it does an impression of a rupture through the cartilage forming the epiphyseal line, is misleading. Rarely, if ever, does a fracture occurring after complete ossification follow closely what was formerly the cartilaginous interval. Although a portion of its course may be involved, there will be a marked deviation of the fracture course from the crescentic line that marked the location of epiphyseal union.

Of the numerous types of fracture that involve the lower end of the humerus, I shall, in this paper, consider only two: the supracondylar and, for comparison, separation of the lower major humeral epiphysis. While these present many features in common, they are distinctly different and each offers also its own individual problems. Authorities classify these fractures very differently. Some distinguish between fractures from hyperextension and fractures from hyperflexion according to the relative state of the forearm when the fracture was sustained and the direction of the force producing the injury.

The term supracondylar fracture is applied to transverse fractures of the lower end of the humerus occurring above the epiphyseal line and often crossing the olecranon fossa. Separation of the major epiphysis as a whole can occur only after fusion of the separate centers about the thirteenth year and before complete ossification has taken place at the twenty-second year. The ossifying trochlea may be detached *en masse* with the capitellum and after the center of ossification appears, may be diagnosed roentgenologically and should be treated in the same manner as those cases occurring between the foregoing age limits.

That the most accurate method of learning the presence and type of fracture and the position of fragments in these cases is from the roentgenogram will scarcely be disputed. For a correct determination of these factors, however, the roentgenologist must be especially careful to possess a correct knowledge of the normal for the age of the patient and, what is hardly of less importance, to obtain his views from such angles or positions, and with such care for other details that his roentgenogram will convey to him a correct impression of the existing conditions. Surely the surgeon should not be blamed for bad results when he has been wrongly guided by an unskilled roentgenologist.

It is not at all difficult to seat a fairly intelligent and trusting child beside a table with his elbow resting on a film in a position that gives the least discomfort, obtain a view, and then, perhaps rotating the arm somewhat, repeat the exposure one or more times. Films made in this "hit or miss" manner are misleading and are often worse than worthless. It is far from a simple matter in many cases, especially in children, to obtain views that are entirely satisfactory, and the patience, tact and ingenuity of the roentgenologist are often taxed to the utmost.

Usually two views made at right angles to each other are ample, but the greatest care should be taken that in the lateral view, the central ray passes straight through the center of the joint with the elbow semi-flexed and the arm and forearm parallel with the flat film; and that the antero-posterior view be made with the forearm extended as completely as practicable and the central ray again directed through the center of the elbow in the antero-posterior direction. It will sometimes be found impossible to obtain satisfactory extension of the forearm, in which case a view should be made with the humerus as nearly as possible parallel, and, if necessary, a third view can be made of the upper forearm.

With the elbow fixed in hyperflexion, the antero-posterior film should be made by passing the rays straight through the upper forearm and lower humerus. In obtaining these views, I have found a triangular block such as is used in mak-

ing films of the frontal sinuses of the greatest advantage in some cases.

In the properly made roentgenogram the lateral view should show the condyles as if superimposed and the radius and ulna in normal relation to the capitellum, which is visible through the greater sigmoid notch in the ulna. It should also show any obliquity of the fracture line that may exist and its direction, whether upward and forward or upward and backward, the nature and extent of the anterior and posterior displacement and any overlapping that may be present. If rotation of the detached fragment has occurred, the lower end of the shaft fragment will appear in oblique view, while the broken fragment with the articulating radius and ulna is seen in a true lateral. This is of very great importance to the surgeon in directing his manipulation.

The antero-posterior view alone can determine the lateral displacement. Not infrequently a transverse crack, scarcely visible, may be seen through the olecranon and coronoid fossae, or the crack may not extend through both cortical surfaces, gaping only on the front or back. This is seen in the "green stick" fracture of this region and necessitates a careful consideration of the normal forward curve of the humerus near its lower end.

Perhaps the elbow offers the most fertile field for errors in roentgenographic interpretation of any of the joints by reason of its numerous epiphyses; and in the young subject, the roentgenologist should never make a negative report concerning the whole elbow but should confine his statement to the ossified portions of the bone and should state whether or not the epiphyses, if visible, are in their normal location, bearing in mind that there may have been an epiphyseal separation and the detached fragment perfectly replaced. It may be well at this point to mention the fact that the perfectness of reduction or the degree of deformity, when the fracture is seen, is not always a definite index to the disability that may result from new bone formation due to stripping the periosteum at the time the injury was received. One often sees subperiosteal new bone splinting the humerus, perhaps on all sides, as high up as the middle of its shaft. This new bone may so fill in the radial, coronoid and olecranon fossae that complete flexion, extension, or both, may be impossible.

It is not the purpose of this paper to deal with the surgical methods of reduction further than to emphasize the necessity for fluoroscopic guidance, if difficulty in securing proper apposition is encountered. Only by a roentgenogram made after reduction and after the permanent dressing has been applied can one be sure that one is about to leave to nature's processes the best possible anatomical replacement.

Except in rare instances, as in some cases of flexion fracture with marked upward and forward obliquity, the position of hyperflexion seems to give best results both in securing and maintaining apposition. In the small percentage of flexion fractures the sling-like action of the triceps when the forearm is hyperflexed may tend to lift the lower fragment too far upward and forward, increase the separation, and produce overlapping. Semi-flexion may better serve in these cases.

In a certain percentage of cases proper manipulative reduction or maintenance of reduction will be found impossible without too great injury to the soft structures. In such cases an open operation is far better than trusting to luck and nature's kindness to cover our failures.

The judicious employment of motion, both passive and active, at an early date is strongly advised by the best authorities. With due care to prevent displacement by supporting the elbow and avoiding sudden movements, gentle stroking and massage with active movements at the elbow may be begun on the fourth day refixing the elbow in the hyperflexed position after each treatment. The dressing is rarely necessary after the third week, and proper painless exercises should then be employed to restore normal flexion and extension (Scudder).

In conclusion I would emphasize the following points:

(1) Know the normal anatomy and development of the elbow at all ages.

(2) Proper diligence on the part of the roentgenologist is necessary to secure views made at such angles and of such quality that they give the greatest possible amount of information.

(3) After the best reduction possible has been secured by manipulation under fluoroscopic control, films should be made for a permanent record after the fixation dressings have been applied.

(4) If for any reason proper reduction cannot be obtained, an open operation should be advised.

(5) Conservatism in prognosis is of the greatest importance on account of damage that may have been done to the soft structures.

(6) Bear constantly in mind that the attending surgeon receives little credit for good results. They were expected when he was called to the case. If his results are bad, however, never ending blame follows him.

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DISCUSSION (Abstract)

Dr. William Tate Graham, Richmond, Va.—An improperly made x-ray is a disaster. What we wish to know is how to restore the patient and how to prevent deformity, and whether the fracture is intra-articular or extra-articular.

It is well to put these fractures up in the Jones position. Acute flexion produces very good position. The articulating portion is one of the things we always fear. There is no fracture which produces so much prolonged swelling and prolonged pain as an incomplete reduction. While we do most of our reductions under the fluoroscope and follow them up with an x-ray plate, we find we have to correct our work often, and we are always glad to have the help of the roentgenologist to tell us how.

In this matter of the Jones' position, I have in mind two very disastrous results which happened within forty-eight hours. These patients were put up and were allowed to go home. They did not come back to be dressed. When we got them, there was a great deal of damage and disability. If there is very much swelling and you cannot get flexion as acutely as you want, use the anterior position or a posterior molded splint, and then, as the swelling decreases, you can increase the flexion, which is much safer than to force flexion in the very early stages. Sometimes it is necessary to wait and do an open operation later.

Dr. W. R. Bethea, Memphis, Tenn.—Dr. Gray has stressed a very important point, that of not setting these fractures completely too early. We have found that if our fractures are set by the fourth or fifth day the results are very good and we get less swelling, especially if much damage is done to the soft tissues on the anterior surface.

One point in the Jones' position I wish to stress, and that is that acute flexion does not mean Jones' position. Acute flexion with the palmar surface of the hand facing the shoulder joint is Jones' position. Many turn the thumb toward the shoulder or face in supposed Jones' position, which produces a rotation in the fragments at the sight of fracture and gives some very constant deformities. The arm should be placed so that the palm of the hand is turned toward the shoulder joint, then when the arm is fixed to the chest wall, if it is fixed at all, the palm will be turned toward the patient's face. Dressings should be so applied that this position is maintained, as it is the disposition of most patients to place the thumb toward the face and the palm on the chest or opposite shoulder. The inexperienced often overlook this point.

Dr. Isidore Cohn, New Orleans, La.—I became interested in this subject, because nearly twenty years ago the radiologists were reporting to us, "no evidence of fracture," in children five, six and seven years of age where there was an epiphyseal fracture, and "epiphyseal separations" in joints clinically normal I wondered why it was that we were treating a good many patients and getting them well when there was originally nothing the matter with them.

There are certain lines which have been a help to us in studying our x-ray pictures. One is, if you will pass a plane, with the arm extended and the forearm completely supinated, through the long axis of the shaft of the humerus and a plane through the long axis of the ulna, there will be formed an angle of about 170 degrees, with the apex inward, of course. That we have all known for many years as the "carrying angle." The radiologist should tell us that if there is a deviation from that angle there will be a deformity. Everybody has not made a detailed study of it, and we are largely in the hands of the radiologists. Another thing of importance is the relation of the capitellum to a plane which passes through the middle of the long axis of the humerus. In young people under ten years, this plane passes behind the capitellum. As we grow older and assume the adult type about two-thirds of that capitellum or the lower articular surface is in front of the plane. My observation has been that in the child this plane is behind the capitellum. If for any reason the capitellum is behind that line, the radiologist can state that there is a deformity which should be reduced. That is illustrated in one of the pictures which Dr. Gray showed. This patient is already beyond eight years and the capitellum is away in front of that line.

I have been very much interested in the question of the number of epiphyses at the elbow. We have been able to find constantly only three. The external epicondyle has not been constant with us. We have found only one remaining after the seventeenth year, the internal epicondyle. The point about the internal epicondyle that I think is of extreme importance is that it is continuous with the internal oblique line of the shaft. If it is displaced downward, there is a definite fracture. There is a great amount of talk about epiphyseal separations. I think these are fractures, a fracture in epiphyseal line. The shaft is united by cartilage to the epiphyses. It is not put on like a stamp or mucilage on a piece of paper. We should discontinue talking about epiphyseal separations, because many surgeons say if it is an epiphyseal separation it does not mean anything. I believe it is of very great importance.

Many people think hyperflexion is the Jones' position. Hyperflexion and complete supination are proper in supracondylar fracture and fractures about the external condyle. They are not indicated in fractures of the internal epicondyle, because the pronator teres originates there. If we supinate the forearm, we are going to increase the distance between the shaft and the fragment, whereas, if we pronate the forearm, we bring into apposition with the shaft a fragment over which we have no control.

As to open operations, surgeons should keep their hands off, if possible, anything that has to do with the epiphysis, because they will bring about premature ossification.

Dr. A. M. Shipley, Baltimore, Md.—The surgeon is apt to look upon the roentgenologist as a technician and does not consult with him. If we follow up these cases together and check our results, we can gather data as to the relationship between the position of bone fragments and the result. We are dealing with three things, the injury, the deformity, and finally the disability.

Generally speaking, if the displacement is away from the joint, it may cause no trouble, whereas a small piece of bone displaced into the joint, or toward the joint, may cause considerable disability. We should consult with the radiologist as to whether displacement may lead to future disability.

We should form a working combination with the roentgenologist and consider the cases from the standpoint of disability and not from the standpoint of deformity.

Dr. Gray (closing).—Dr. Graham says the Jones position may lead to bad results. Of course, it may. It is to be assumed that the arm and forearm should be carefully watched to see whether the circulation or the innervation is interfered with. A more or less constant or daily inspection of a fracture put up in the Jones position should be emphasized.

Dr. Cohn said that he thought the term "epiphyseal separation" was bad. There is no question at all in my mind that the diagnosis, epiphyseal separation, is nine times out of ten erroneous. When roentgenologists report epiphyseal separation, it is very often not a separation, it is a supracondylar fracture.

Of course, there are times when the roentgenologist has to mention that the epiphysis has been separated. For surgical purposes, just as Dr. Cohn has said, the term may be bad but for x-ray purposes, when the film shows that the epiphysis is back in position and we know from what we have observed that there has been a fracture through the epiphyseal line, we have, of course, to refer to these as epiphyseal separations. I agree that they, too, are fractures.

I am grateful to Dr. Shipley for his recognition of roentgenologists as physicians. We can often help the surgeon, if he will let us, by examining the case frequently, especially as to new bone formation which, as I have shown in these slides, is often present and is a result of stripping up the periosteum.

TYPHOID OSTEITIS: REPORT OF TWO CASES*

By CHAS. C. GARR, M.D., F.A.C.S.,
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Typhoid osteitis is a complication of typhoid fever due to an invasion of osseous tissue by the typhoid bacillus. It may occur during the febrile stage, during convalescence, or may follow many months or years later.

The space of twenty-seven years between an initial attack of typhoid fever and the onset of bone complications in a case aroused my interest in the subject and a study of the literature convinces me that this malady is none too well understood. Errors of diagnosis perhaps are due to incomplete laboratory investigation in many cases of bone necrosis.

Maisonneuve in 1835, Keen in 1876, and Ebermaier in 1889, described bone complications of typhoid fever and Ebermaier proved his case by culture of bacilli from the bone marrow.

John B. Murphy, in 1916, analyzed eighteen thousand eight hundred and forty cases of typhoid fever gathered from the literature and has given us 0.82 per cent as the percentage in which osteitis or periostitis develops. McCrae found only 0.5 per cent at Johns Hopkins, while the London Fever Hospital had 1.3 per cent of bone complications. From Murphy's analysis of cases of typhoid fever reported in the literature, we should have one hundred and fifty-five of osteitis, but Winslow was able to find only one hundred and one cases in the literature in which *B. typhosus* was recovered. To this number he added two of his own.

The sex incidence is roughly the same as in typhoid fever, namely: 73 per cent males and 27 per cent females. No age seems exempt. Cases are reported from 2 years to 70 years. Seventy-five per cent of cases develop between the twentieth and fiftieth years. Former injury and lowered resistance of a part are predisposing causes, muscle strain, trauma, old fractures, fatigue and tuberculous scars being particularly mentioned.

Only one bone is involved in two-thirds of the cases. Six bones were mentioned in each of two cases collected by Winslow and ten bones in Furbringer's case. Any bone may be involved, though the tibia is most frequently attacked. The femur, ribs and costal cartilages, ulna and radius follow in the order named.

While 75 per cent of cases of typhoid osteitis develop during the febrile stage or during convalescence, 25 per cent have their onset months or years later, and the diagnostic problem of these later cases has prompted the writing of this paper.

The typhoid bacillus can live a period of years in osseous tissue. It has been recovered following the initial attack three and one-half years later by Lilienthal, ten years later by Bunts, thirteen years later by Tubby and Hicks, twenty years later by Porter and twenty-three years later by Fogh. In one of my cases it was isolated twenty-seven years after typhoid fever, which is the longest time recorded in published reports. Whether the bacillus finds residence in the bone marrow during the acute infection when the blood culture is positive or is later carried from some viceral focus is problematical. Since the

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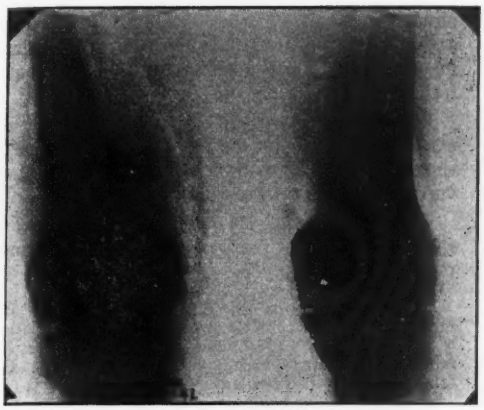

Fig. 1
August 28, 1924. Showing extensive periostitis in the lower extremity of the left femur.

acute symptoms may readily subside not to return for months, I believe the infection has always remained latent in the bone and other factors stir it into activity.

The classification of Hutinel, more to the point than that of Klemm, makes the following divisions:

(1) Circumscribed osteitis in which the constitutional symptoms are of little consequence and the pathological condition undergoes spontaneous recovery.

(2) Suppurative osteitis in which both general and local symptoms are of marked degree.

(3) Osteitis of the collar button type in which the symptoms are mostly local and slow in onset. There is a periosteal proliferation and excavation into the cortex.

It is the suppurative type to which I would mainly direct your attention. The symptoms are pain in the affected bone, dull and boring in type, and with slight remission. This pain has been described as resembling the osteocopic pain in secondary syphilis. There is increased local temperature and tenderness to pressure, and slight swelling at first which increases.

Fever is not a constant symptom, but one of my cases had a daily elevation varying from 99 to 103° F. without the proportionate increase in the pulse. Murphy says as a rule there is an entire absence of fever. Profuse sweating sometimes follows when the temperature subsides.

The blood shows a leucopenia with no increase in neutrophil count. As the osteitis progresses into suppuration, there is a rise in the count of the neutrophils. Murphy believed that the leucopenia was responsible for the tardiness of suppuration.

The role of the Widal reaction is a subject for further study. It is usually positive in these cases. In a series of thirty-three cases tabulated by Winslow, mention was made of the Widal in twenty, all of which were positive. Eighteen of these, however, occurred within six months of the original attack of fever. One followed in six years, but he had been in the army and no doubt had had typhoid vaccination.

The Widal reaction may remain positive for months or years following convalescence from typhoid fever. Hence it would appear that a positive Widal would not be of great diagnostic value in typhoid osteitis, but when found concurrent with obscure bone symptoms would give one a lead for investigation.

At present the agglutinins are regarded as playing a subsidiary role in immunity and the agglutinating power of a serum gives no indication of the degree of immunity that exists. As proof of this, we know that relapses occur in typhoid fever when the titre of specific agglutination is at the highest.

With rest in bed there is a gradual cessation of the symptoms after weeks or months and the affected part seems to return to normal. Nature apparently conquers the infection for a time, but not completely; for it will lie dormant for a few months and return with all its active symptoms.

The tendency of the disease after suppuration is to thin the cortex by necrosis, perforate it and attempt a sinus to the surface. Spontaneous rupture or incision will relieve the symptoms of pain and pressure, but a persistent sinus remains.

A remarkable fact about these sinuses is the absence of mixed infection. I have made cultures months after drainage had been instituted and after antiseptics had been used, which showed nothing but *B. typhosus*.

X-ray evidence is more characteristic in the collar button type. In the suppurative type it is slow to appear. In the latter there is at first a thickening of the periosteum with some new bone formation, which is always suggestive of syphilis, and many cases have been given antisyphilitic treatment as a therapeutic test. Later the x-ray films show a lessened density and the abscess cavity can be outlined.

A review of the earlier literature of treat-

Fig. 2
February 2, 1925. Showing beginning rarefaction in the medulla just above condyles.

ment of this condition discloses results exceedingly bad. Drainage, curettage, packing with antiseptics, including the hypochlorite of calcium (1-1000), have given poor results. Case after case is reported which has had one to seven operations without benefit. Murphy devised an operation of wide excision of many ribs in costal infection. Winslow reports all the cases treated by vaccine therapy up to 1925, a total of thirty-three cases. All of these were cured by vaccine alone or by vaccine with operation. A study of his report is convincing proof of the value of vaccine therapy since many of them had had operation alone with unsatisfactory result.

Dupraz (1892), Unger (1901) and Lilienthal (1907) closed their incision and obtained healing by first intention. Subsequent reports on these cases are not at hand and mention is not made of recurrence.

Rosenberger (1911), Dachtler (1913), Murphy (1916), Emile-Weil (1921), Sicard and Robineau (1921) have shown that under the influence of vaccines typhoid osteitis can be cured with rapidity. Emile-Weil reports a cure after three weeks of vaccine treatment in a patient who had a typhoid fistula for two years and had had seven operations. With the same treatment he cured another case who had had three operations.

The interval between vaccine treatments varies in the hands of different observers. The dosage and strength of vaccine is gauged by the reaction of the patient. Larger doses are required in the suppurative form than in the plastic form.

When suppuration has occurred and no fistula exists, surgery should be employed. The cavity should be cleaned with a curette, packed, then vaccine treatment should be begun.

The following case is of interest because of the time which elapsed before the bone symptoms appeared:

Dr. E. B., 48 years old, white, and married. His father died at the age of 68 with apoplexy. His mother is living and well. No tuberculosis or cancer in his family. The patient had typhoid fever in 1896. His other history is unimportant.

In 1905, after jumping a tennis net, he had pain in the right knee. He was lame for five days, then the symptoms disappeared. In the next eighteen months he had several attacks similar to this and usually had some fluid in the knee joint. The symptoms always subsided with rest in bed. In October, 1906, Dr. Carlton Flint removed the internal semilunar cartilage from his right knee. He said the cartilage was loose and there was an area of necrosis 2-3 cm. in diameter on the under surface of the internal condyle. The cartilage showed inflammatory change, but the cause was not determined. Primary union was obtained in the incision and the patient was walking with some stiffness in four weeks. After two months, pain and swelling developed and he was on crutches for seven months, since which time the right knee has never given any trouble.

In April, 1923, he had severe pain in the internal condyle of the left femur, and became unable to walk

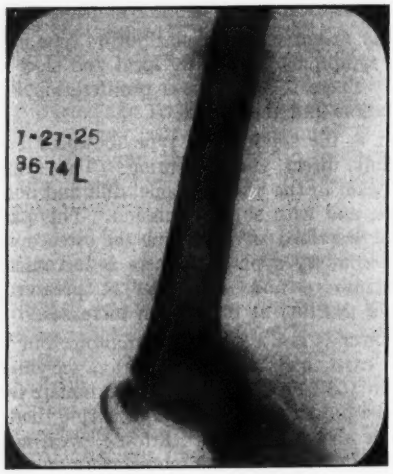

Fig. 3
July 27, 1925. After the second operation and institution of typhoid vaccine. The cavity is half filled in.

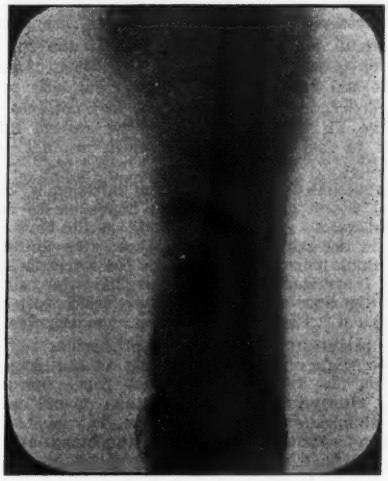

Fig. 4
December 8, 1925. Final result. No sinus after completion of the vaccine treatment.

within 24 hours. For two weeks he had severe boring pains in the lower femur and knee, the pain being worse at night. During this attack he had daily fever and sweats, the temperature being as high as 103° F. at times and the sweating profuse. Aspirin, 70 gr. daily, controlled the pain more than opiates. Following the two weeks of acute symptoms he had a normal temperature, but was on crutches for three weeks when all symptoms subsided.

Ten months later (in February, 1924) the disability returned, but was not accompanied by fever and sweats. Three weeks on crutches restored him to normal again. Six months later (July, 1924) the symptoms of severe boring pain, fever and sweats returned. He was in bed for four weeks and on crutches four weeks when all symptoms again subsided.

One month later disability, knee flexion and swelling in the popliteal space appeared, but without pain or general symptoms. After eight weeks his symptoms again subsided. In December, 1924, and January, 1925, he walked without support and without pain.

Many x-ray films had been made during the several attacks and showed a gradual decrease in the density of the lower femur and internal condyle with thickened periosteum.

February 1, 1925, symptoms returned and an exploratory operation was done February 7, 1925. Incision was made over and above the mesial condyle of the left femur. A thin, brownish red pus filled the popliteal space and surrounded the femur. The medullary cavity was opened and curetted of a soft, mushy inflammatory material. The wound was packed with iodoform gauze.

A culture of the pus produced a growth of Gram-negative bacilli of the colon group. As the bacilli were non-motile, further investigation was not made. A vaccine was made, but only a few doses were given.

The post-operative notes are not significant, except that the sinus persisted and in a few months another sinus burrowed around the knee and pointed on the anterior surface of the upper third of the leg. After the sinus had persisted four months, another and more extensive operation was done, wider exposure was sought and more complete excision of necrosed tissue.

The pus was again cultured and produced the same non-motile Gram-negative bacillus. After five successive transplants were made, the motility returned and *B. typhosus* was identified.

Following the second operation, vaccine therapy was begun and a cure effected. I am of the opinion that the second operation would have been unnecessary had vaccine therapy been continued after the first operation. There has been no recurrence up to date.

In this patient the Wassermann was repeatedly taken on account of the x-ray evidence of periostitis, but it was always negative.

The white blood counts were

6200 on July 29, 1924
6400 on August 12, 1924
10300 on August 28, 1924
9200 on January 29, 1925
13500 on February 2, 1925
11800 on March 30, 1925
7300 on June 30, 1925

The polymorphonuclear count varied from 64 to 80 per cent.

The Widal reaction was strongly positive in this patient. He had had two typhoid vaccinations on entering the army.

The culture of the pus obtained was agglutinated by anti-typhoid serum in a dilution of 1-3200, and there was no agglutination in *anti-paratyphoid A* or *B*, 1-50 dilution.

The serum from the patient agglutinated his own culture in 1-800 dilution and the laboratory strain in 1-1200 dilution.

The Widal on October 23, 1926, agglutinated in 1-100 dilution.

An unsuccessful attempt was made to isolate the bacillus from the blood and stool.

The post-operative treatment consisted of wound dressings, keeping the cavity open with packing and the instillation of various antiseptics, mercurochrome, Dakin's solution and argyrol being tried.

Twenty-six doses of vaccine were given. Autogenous vaccine, 1 c.c. containing 100 million, was used, starting with 0.2 c.c. and increasing 0.2 c.c. every five days. After the tenth dose a vaccine containing 400 million to 1 c.c. was used. Vaccine was begun July 9, 1925, and the wounds were entirely healed September 21, 1925, and there has been no recurrence since.

The second patient with typhoid osteitis was referred to me because of a discharging sinus from the left costal region near the sternum. She had typhoid fever in April, 1925, and in the beginning of her convalescence she noticed a small lump in the costal cartilage. About two weeks after her convalescence, which was in July, 1925, this mass caused some pain and persisted until February 1, 1926, when it became soft and ruptured spontaneously. She was examined by me February 19, 1926, and a culture of the pus produced pure *B. typhosus*.

While she came for surgery, it was not advised. An autogenous vaccine was prepared, and she was subsequently treated by Dr. John Scott, of Lexington, Ken-

tucky, who injected increasing doses every five days. After five months of vaccine treatment she was completely cured.

During the treatment her Widal was positive and the culture of the pus produced repeatedly an uncontaminated growth of *B. typhosus*.

My conclusions after a study of this subject are:

(1) Incomplete laboratory investigation is responsible for the few cases of proven typhoid osteitis.

(2) A history of typhoid fever in a case of obscure bone lesion is of great importance.

(3) Vaccine therapy combined with surgery to obtain drainage is curative.

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DISCUSSION (Abstract)

Dr. F. G. Hodgson, Atlanta, Ga.—When I was an interne, we saw these cases quite frequently. We operated upon them again and again, and they did not heal up. Upon receiving the title of this paper I looked over a large number of bone radiograms at the Grady Hospital, but could not find a single case of typhoid osteitis, which shows that the disease is much rarer now than formerly. There is no excuse for the condition, and I think eventually we shall not see it at all.

Another comforting thing is the satisfactory treatment of these cases. This is one of the few conditions in which vaccine therapy has proven almost unfailing.

The essayist brought out the importance of careful history taking. All these cases give a history of having had typhoid fever, but we may have to go back as far as twenty-seven years to find the primary infection.

A careful laboratory investigation at the time of operation is important. We cut into a case of osteomyelitis and find pus. We presume that it is caused by staphylococci or streptococci, and may not even take a culture. If we do take cultures we are not careful enough to find typhoid bacilli which are not easily identified.

The question whether this latent infection is in the internal viscera or in the bone is impossible to decide in most cases. We know typhoid bacilli have been found in the gall bladder many years after an attack, and I think it is possible that they could remain in the bone. I operated upon a case recently who had had pus in the bone for seventeen years, which had never drained out. The culture, however, was negative.

The persistent positive culture of *Bacillus typhosus* in these sinuses is the greatest aid to our diagnosis. The fact also brought out by the paper that these sinuses, after persisting for a long time, do not develop a mixed infection like other sinuses, but give a pure culture of *Bacillus typhosus*, is also important and helpful.

Dr. J. Albert Key, St. Louis, Mo.—It struck me in listening to this paper that probably most of the cases of typhoid osteitis which I should see I should probably diagnose as syphilitic.

Here we have an infection which enters the body, is segregated in the bone and lives in perfect peace and harmony with the body tissues for an indefinite period. Suddenly it lights up and causes trouble, just exactly as it does in syphilis, and as in syphilis a great many of the cases of typhoid osteitis give a history of a preceding trauma which seems to have some influence on the condition. The x-ray picture is, I should say, practically identical with that which you get in syphilis. Here we usually have a negative Wassermann. In bone and joint syphilis it may or may not be positive.

Perhaps I have operated upon some cases of typhoid osteitis without recognizing them. I have certainly operated upon a number of low grade bone infections which have drained a long time afterward. It never occurred to me to try to run down the typhoid bacillus in those infections and give a vaccine.

I wonder what percentage of these cases do not heal under the ordinary treatment of osteomyelitis. I had the impression that this is a rather benign type of osteomyelitis as contrasted with ordinary pyogenic osteomyelitis. Most of the men here have a conception of chronic osteomyelitis rather different from that of the men who are not doing much bone and joint surgery. Most of us are rather pleasantly surprised when we operate upon a case of chronic osteomyelitis which heals up promptly. At least, that has been my experience. In looking over the literature I got the impression that a good many cases of typhoid osteomyelitis heal after a thorough operation. Phillip Wilson reported a case a few years back in the ulna which he operated upon, then Dakinized. After four days he did a secondary closure, and the wound stayed closed.

Cotton has drawn attention to the fact that bone infected with typhoid has a tendency to heal rather quickly, but that when the infection is in cartilage, prolonged drainage is the rule. I should like to ask if that has been Dr. Garr's impression.

Dr. W. Barnett Owen, Louisville, Ky.—We do not see so many cases reported in the literature now, as we

did formerly, of typhoid osteitis; I think primarily because typhoid fever does not occur so frequently as in former days.

My experience with osteomyelitis has been very similar to Dr. Key's. I believe more cases have been operated upon more than one time than I have had the pleasure of curing at one operation. We see cases of osteomyelitis that are classed as cured which go on for six months, a year, two years, and then very slight injury will cause a lighting up of the old condition. It is very difficult to state when osteomyelitis is cured.

Dr. E. B. Bradley, Lexington, Ky.—As Dr. Key stated, most of these cases are mistakenly diagnosed syphilis. The boring pain which is so much worse at night is the same in both conditions. Neo-arsphenamin was given to me when I had typhoid osteomyelitis and apparently helped the pain.

My Widal has been negative in the past, I am sure, but I had two courses of three inoculations each against typhoid in 1917 and 1918. My agglutination test was positive when taken after the typhoid bacilli had been isolated from my wound. Cultures of the stools were consistently negative. In all the reported cases where mention has been made of a Widal reaction, this test has been positive. Perhaps it would be worth while in any obscure case to have a Widal reaction.

Dr. Garr (closing).—Dr. Key probably refers to the plastic form of typhoid osteitis, which has a tendency to recover. Those cases, my study shows, seem to get well without doing anything. There was a reported cure in a short time with Dakin's solution in Dr. Wilson's case (Boston), but I did not ascertain whether the patient remained well. I am positive, however, from what study I have made of the subject that typhoid osteitis, whether it is in the rib, cartilage or in the long bones, can be cured by repeated doses of typhoid vaccine. All the cases that have been treated with vaccine that I can find in the literature have been cured. Keen and Murphy had great difficulty in effecting a cure and Murphy described an extensive dissecting operation for costal cartilage involvement. The vaccine treatment is simple, and when we can make a positive diagnosis we can usually effect a cure.

PULMONARY TERATOMA: CASE REPORT*

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and
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The accepted rarity of pulmonary teratomas occasions a report of this case.

History.—A seaman, a native of Sweden, 33 years of age, single, white, was admitted to the U. S. Marine Hospital, Mobile, Alabama, on March 19, 1925, complaining of cough, shortness of breath and pain in the left side of the chest. The family history was negative as regards the occurrence of tumor or tuberculosis. He smoked moderately, but was a heavy drinker. He had had no illness aside from a chancre in 1915, following which he received anti-syphilitic treatment.

During the latter part of December, 1924, three months before admission, he began to have pain in the left side of the chest, occasional cough, shortness of breath and night sweats. During this interval he lost forty-three pounds in weight. These symptoms gradually increased in severity and the shortness of breath became so pronounced that he was unable to sleep with comfort.

Examination.—The patient was a well developed and well nourished adult white male. The mental state was normal. The temperature was 37.6° C. (99.6° F.), the respiration 24, the pulse 120. The left chest was slightly larger than the right and presented bulging of the intercostal spaces in the lower part, especially posteriorly. There was absence of respiratory excursion of the left chest. The external jugular vein on the left was definitely distended. Tactile fremitus was absent over the left chest from the fourth rib downward, both anteriorly and posteriorly. There was dullness on percussion, and absence of breath sounds in the same area. The right lung was clear and hyperresonant throughout. The cardiac impulse was heaving; the apex beat was noted in the fifth interspace within the nipple line. A blowing systolic murmur was heard at the apex and was transmitted into the axilla. The blood pressure was, systolic 130, diastolic 70. Physical examination was otherwise negative. The axillary lymph glands were not enlarged. The genitalia were well developed and normal.

Laboratory Examination.—Urinalysis was negative. Blood examination gave: hemoglobin, 70 per cent; white blood cells, 9,400; red blood cells, 3,950,000; polymorphonuclears, 74 per cent; small mononuclears, 22 per cent; large mononuclears, 4 per cent. The blood Wassermann was negative.

The roentgen ray report was as follows: "The cardiac shadow is pushed to the right. It is impossible to get a definite outline of the left heart because of a large dense shadow occupying the costo-phrenic angle, which extends to the fourth rib. No fluid level is established on fluoroscopic examination. It is possible that the shadow is caused by encapsulated fluid, or possibly by a tumor mass."

On the assumption that there was an encysted collection of fluid in the left pleural cavity, an aspirating needle was introduced between the sixth and seventh ribs below, but slightly anterior to, the angle of the left scapula. The puncture resulted in the withdrawal of a few drops of blood only. Thorocentesis was also performed on three subsequent occasions, but with negative results.

Course of the Disease.—The condition of the patient became progressively more unfavorable. On April 18, one month after admission, the respiration became very labored; the patient perspired profusely on the face. The patient habitually lay on the affected side; pulsations of the right carotid were pronounced; the left external jugular vein was prominent and descended in abnormal position down over the thorax, passing anterior to the left clavicle; there was absolute fixation of the left chest on respiration; all superficial veins over the left chest were markedly dilated; bulging of all intercostal spaces was evident. The right chest showed hyperresonance in the upper and outer portion. The left chest showed flatness from the third rib down-

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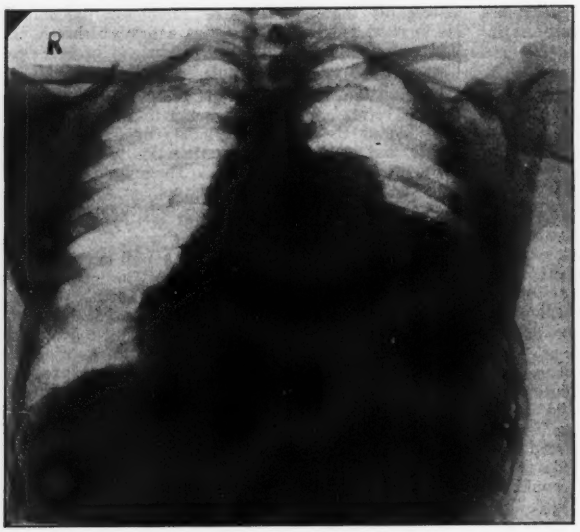

Fig. 1
Roentgenogram of chest at the time of admission of the patient to the hospital.

ward both front and behind; and impaired resonance from the third rib upward. There was complete absence of voice sounds over the whole left chest. The left border of the heart could not be determined; the right border extended 8 cm. to the right of the sternum. X-ray examination of the chest on this date, April 18, was reported as follows: "The opacity has increased to such an extent on the left that the apex is totally obscured. The heart is pushed over to the right so that now only a small portion of the lung periphery on the right is shown, and this shows small discreet mottled areas. The impression is that the condition existing is a malignant tumor."

On April 22 a portion of the eighth rib, 1½ inches in length, was resected in the left posterior axillary line under novocain infiltration. The lung having been under great pressure, bulged into the wound thus made, giving to the patient a feeling of relief. Exploration with the finger revealed a firm mass extending in all directions; the mass was punctured with an aspirating needle but without result, save the withdrawal of a few drops of blood.

Diagnosis.—A diagnosis of malignant pulmonary tumor, probably sarcoma, was made.

Termination.—The patient died on April 29, 1925, one month and ten days after admission, and approximately 4.5 months after the first onset of symptoms.

Necropsy.—The body was well nourished. On opening the abdomen, the dome of the diaphragm on the left side was found distended downward to a level with the twelfth dorsal vertebra. On opening the thoracic cavity, a large mass was found completely to fill the left chest; the heart was displaced and occupied a position wholly within the right chest. No fluid was encountered; the pleural cavity on the left side was completely obliterated by adhesions. The left lung, pericardium and mediastinal glands were found to be incorporated into a mass, which had pressed the right lung into the outer and upper wall of the right chest. Three or four mediastinal glands were found to be rather delimited in arrangement and varied in size from a pigeon egg to the size of a lemon. The whole mass was of brownish white appearance, and was rather firm in consistency. Nodules the size of marbles were scattered throughout the right lung, and had the appearance of the tumor mass on the left, as contrasted with the normal color of the right lung. The bifurcation of the trachea was found to be encased in the mass. The upper and lower lobes of the left lung were matted together and were voluminous in size, appearing to be about four times the size of the normal lung; the lung was of a brownish white color. Crepitation was distinctly absent, except in a small area in the lung apex. The whole mass, except in the apex area mention, was of rather hard consistency. A deep incision was made through both lobes on the anterior surface from the apex to the base; several areas were encountered which were cut with much difficulty. On cut section all lung markings were found to be completely obliterated, except the bronchus in the upper lobe, which exuded a pus-like material upon pressure. An area four inches in

Fig 2
Roentgenogram of chest one month after admission and ten days before death.

Fig 3
Posterior view of right lung, heart and tumor mass composed of left lung and mediastinal glands.

diameter, involving the lower lobe, the interlobar space, and a small portion of the upper lobe was noted. This area was of a whiter color than the balance of the tumor mass and was of cartilaginous consistency to the touch; this area was not encapsulated. A small grayish-white hard nodule was noted in the pericardium. The gross post-mortem findings were otherwise negative, except for passive congestion of the abdominal viscera. There was no evidence of metastasis of the tumor into any of the organs of the body, save the right lung and the pericardium. The testicles were normal, as was also the prostate. No masses were noted in the scrotum.

The Hygienic Laboratory of the U. S. Public Health Service, Washington, D. C., reported as follows on tissues submitted for histological examination: "Sections from the specimen labeled 'tumor proper' show new growth made up of both mesodermal and epidermal tissues. Numerous areas are distinctly cartilaginous, others consist of connective tissue cells, some so active as to suggest spindle cell sarcoma, and, in addition, numerous tubules lined with tall columnar epithelium are present. Specimen labeled 'posterior mediastinal tumor' shows a similar growth in which considerable degeneration has occurred. Specimens marked 'lower lobe, left lung' and 'upper lobe, left lung' probably contain some of the tumor growth, but the picture is obscured by inflammatory changes and necrosis. None of the other tissues shows any new growth. Sections from spleen, liver and kidney specimens show evidence of marked chronic passive congestion, the condition being most marked in the liver. . . . It is evident that the new growth present must be regarded as teratoma."

Conclusion.—The absence of primary tumor growth in other organs, especially in the testicles (which, unfortunately, were not sent for histological examination because of the negative gross appearance), leads us to believe that the case in question was one of primary pulmonary teratoma of a malignant character, which most likely originated from the pleura in the interlobar space between the upper and lower lobes of the left lung and invaded both the mediastinum and the left lung.

COMMENT

Christian,[1] in considering tumors of the mediastinum, groups together dermoid cysts and teratomas as it is difficult to define these terms so that two distinct groups can be made, since all have much in common as to the origin and course of development. He further subdivides these tumors into

"three classes: (1) cysts of slight complexity; these are essentially dermoid cysts of ectodermal origin. (2) Tumors of great complexity; these contain derivatives of all three germ layers and may be regarded as teratomas. (3) Tumors of the first or second class which

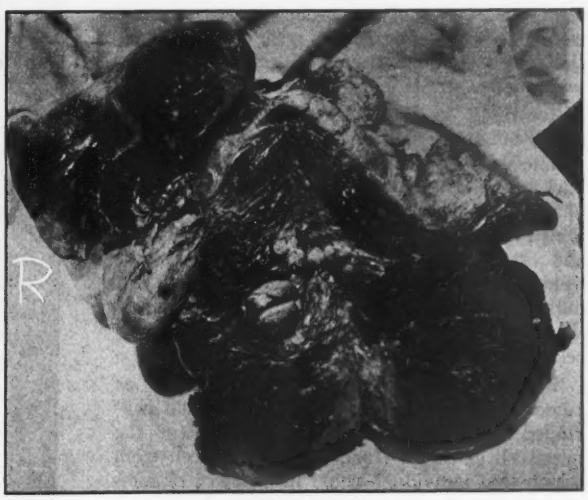

Fig. 4
Anterior view of right lung, heart and tumor mass composed of left lung and mediastinal glands. The left lung has been laid open with a knife from the apex to the base.

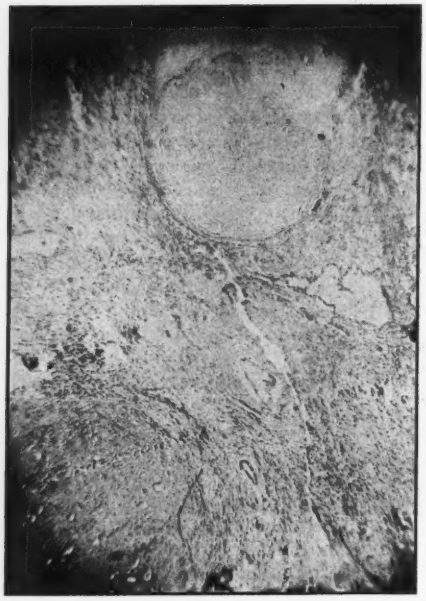

Fig. 5
Microphotograph of tumor, low power.

in some part of their structure show a malignant character and form metastases."

The cystic dermoid and the solid teratomas, in the opinion of Ewing,[2] represent adult and embryonal types of the same growth derived from more than one germ layer. MacCallum[3] classifies a dermoid cyst as a simpler form of teratoma.

According to Bland-Sutton,[4] tumors in the mediastinum originate from cutaneous or subcutaneous cell inclusions, which are displaced backward during the process of folding together of the two halves of the body during early intrauterin life. As regards theory of etiology, Smith and Stone[5] mention the hypothesis that such tumors arise from ectodermal displacements pulled down into the chest by the descent of the heart, or by some abnormal displacement of cells from one or other of the brachial clefts.

Beattie and Dickson[6] define teratomas as tumors which arise from the inclusion and continued development of one individual (or the germ cell or the products of the germ cell from which that individual would in ordinary circumstances have been developed) within the tissues of another individual of the same species, though such a tumor may be derived from one of the early cells originating from the proliferation of an ovum and included in the developing tissues of the individual derived from that ovum.

MacCallum[3] states that solid teratomas are growths in which rudimentary organ-like masses of tissue are mingled together as though in an unsuccessful attempt to form a fetus, but without any development of chorionic elements. Such tumors may occur in the ovary, testicles, or in almost any other situation of the body. He further states that unlike ordinary tumors, which are composed of one type of tissue, teratomas contain representations of all three germinal layers. Many structures may be present, such as bone, cartilage and teeth (Shaw and Williams[7]). The ovary occupies the first, the testicle the second, the sacro-coccygeal region the third and the mediastinum the fourth position in point of frequency for the growth of these tumors (Black and Black[8]). In discussing the point of origin of pulmonary teratomas, Bland-Sutton[4] holds that these tumors originate not in the lung itself, but in the mediastinum to which place they were primarily conveyed from some portion of the thoracic wall, and that from the mediastinum they may invade the pleura or pericardium, and having attacked one or the other, or both, of these coverings, may attack their enclosed viscera.

A search through the literature up to 1924 by

Fig. 6
Microphotograph of tumor, high power.

Smith and Stone[5] revealed a total of one hundred and eight reported cases of dermoid cysts and teratomas. The first case was reported by Gordon in 1823 (Christian[1]). Of these, only eight occurred in children under 12 years of age. Many such tumors, however, are not found until fairly late in life. One case reported was in a man 61 years of age. No attempt is made to cover the literature, as this paper is intended only to report this case.

Symptoms.—Pain in the chest, headache, slight difficulty in breathing and general languor are at first complained of. Severe objective and subjective symptoms usually develop slowly in the chest. Dyspnea, as the growth increases in size, is due to compression of the lungs and heart. Disturbances of deglutition, due to pressure on the esophagus, are rare, and if the sympathetic is involved, there may be an inequality of the pupils (Strumpell[9]). Expectoration may be profuse and the occurrence of hairs in the sputum, according to Christian,[1] Senn,[10] and Norris and Landis,[11] is diagnostic of dermoid cysts. Cough may be marked; hemoptysis may occur. If the growth encroaches upon the large blood vessels, circulatory disturbances may be produced. Cachexia, Hare[12] states, develops as a rule more slowly and is not so pronounced in primary malignant diseases of the lungs as in other forms of malignancy. In the opinion of Christian,[1] patients with tumors of the mediastinum are usually well nourished and show no evidence of cachexia.

Physical Signs.—The physical signs depend upon the size and situation of the growth. Upon inspection, changes in the shape of the chest may be noticed. The chest wall may bulge out and the intercostal spaces may be widened; the superficial veins of the chest wall may be distended. Palpation may show normal or decreased vocal fremitus. Percussion reveals flatness or dullness over the areas involved. Auscultation reveals variable findings. In extensive infiltration the breath sounds may be diminished, or even absent. In the event a cavity is present, cavernous breathing and pectoriloquy may be heard (Hare[12]). Rales of various kinds may be heard in the lung area adjacent to the growth. When the tumor is large, displacement of the heart may occur.

Diagnosis.—X-ray examination is indicated in all cases of a suspected growth in the chest. Our chief reliance in making a diagnosis rests on the x-ray (Myers[13]). The recognition of primary malignant growths is difficult, owing to the fact that the symptoms encountered may be produced by other thoracic affections, which must be eliminated before a diagnosis can be made. Tuberculosis, aneurysm of the aorta, pleural effusion, encysted empyema, pericardial effusion, leukemia and Hodgkin's disease, abscess in the mediastinum, hydatid cyst, retrosternal goitre, gummata and actinomycotic granulomas enter for consideration. These conditions may be eliminated by examination of the sputum, by use of the fluoroscope, by the exploring needle, by x-ray examination, by the course of the disease and by the blood picture. Some cases, however, go to autopsy for diagnosis.

Prognosis and Treatment.—Christian[1] says that every patient with dermoid cyst or teratoma of the mediastinum, once diagnosed, should be promptly sent to the surgeon, but that radical operation is rendered difficult by the proximity of vital organs. Evans and Leucutia[14] report very favorable results from deep therapy with the roentgen rays, when treatment is persisted in. Whittemore,[15] in 1923, reported a case of teratoma of the right chest, which was removed successfully by operation. The whole right lung was pushed up into the apex of the chest, and the tumor had a pedicle that "seemed to have its origin in the mediastinum." However, this appears to have been a tumor of a non-invasive character. In discussing the prognosis of such tumors, Strumpell[9] states that tumors of the mediastinum terminate fatally, sometimes after the duration of six months or a year, and that the treatment can be merely symptomatic. The clinical malignancy of the solid teratomas has also been pointed out by Ewing.[2] In the case reported by us, operation was considered futile. Morphin was administered at frequent intervals during the period of stay in the hospital to allay the patient's great distress.

The authors are indebted to Dr. W. H. Thompson, of Mobile, for the roentgenographic work and the reports thereon, and to Dr. G. C. Lake, of the Hygienic Laboratory, U. S. Public Health Service, Washington, D. C., for valuable criticism.

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MEDICAL DIAGNOSIS*

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From the beginning of medical history, the study of etiology or the causes of disease has occupied the most conspicuous place in the thoughts of physicians. Primarily it has, of course, been the object of medical men to discover the immediate cause of any illness or disease in the belief that, the cause being recognized, the cure might become apparent. As we shall see in connection with an important recent period of medical study, this search for the immediate or specific cause of disease became especially prominent and indeed seemed, and even now seems, in the case of many pathological conditions, so promising that larger though less demonstrably significant influences have been crowded out of consideration. That etiology embraces a study of wider dimensions than merely the investigation of the immediate cause of a certain disease, or certain diseases, is everywhere evident in medical history which contains repeated accounts of attempts to unravel the mystery of disease itself rather than certain diseases through speculations or investigations concerning its causation.

Early schools of medical thought commonly proceeded from the belief that one or another sort of cause is either responsible for all disease, or for great groups of diseases, and systems of treatment were created on such assumptions. Disease or illness was a general conception, and through many centuries no approach to such classifications as have come into use since the growth of the modern sciences had yet been made. The successive conceptions of humors, vapors, irritation, blood, bile and the like as universal causes of disease were so vague and so equally applicable to all disease that there was little advance in these medical philosophies beyond the belief so constantly found among uncivilized peoples that disease results from possession of demons. In effect there is little practical progress in going from the exorcising of evil spirits to the employment of a general practice of bathings, feeding, starving, bleeding, blistering, purging or sweating on the assumption of different schools that each of these methods provided a universal cure, as if disease were an entity due to one cause and removable by a single method.

We must not flatter ourselves with the thought that medical philosophising of this sort was wholly confined to unenlightened periods centuries before our time; conspicuous outcroppings of the same type of generalization have continued to appear even down to this day and seem to illustrate how human a trait it represents. Beneath the veneer of even the most modern scientific attainment there is the cruder stuff that yearns for short-cuts to achieve that which enlightened intelligence finds incapable of such easy attainment. In medicine it takes the form of recurring acceptance of cults that represent disease (whatever its form) as an essence or entity and as removable by some uniform system of practice. Galen inveighed against Empirics, Dogmatists, Methodists, Pneumatists and cultivators of like schools of practice 2500 years ago, but man has not yet divorced himself from the crude belief regarding disease that gives such cure-all systems of practice their reason for being. Psora was once proclaimed the universal cause of disease and misplaced bones within our memory have occupied an equally exalted position, while "animal magnetism" created Perkins' tractors. Very often, indeed, enormously prevalent schools of popular treatment have not even attempted or felt obliged to attempt a hypothetical foundation for their practice. Surely Bishop Berkeley's tar water rested upon no foundation but the credulity born of vestigial remnants of thought rooted in the Stone Age of man.

We cannot solace ourselves with the belief

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that only an uninformed non-medical public has accepted such doctrines. In somewhat narrower lines and in less crude forms the same type of deception has made captive large parts of our profession as well, and we may be certain that the day of doctrines and cults is not entirely done, though their vogue may hereafter be confined in smaller circles.

Gradually as knowledge of the medical sciences increased and as their scope widened, the ontological conception of disease became less acceptable and powerful voices were raised in protest against the continuation of theorizing and of hypothetical systems based upon inadequate knowledge. The newer medical science demanded facts and more facts before any generalization could be justified, and these were rapidly accumulated through the labors of morbid anatomists from Morgagni to Virchow and his followers. Within our day an entirely new aspect was given to medicine by these studies of the structural changes characterizing disease, and an immense body of information was accumulated by pathological anatomists during the century of its pre-eminence, leading not only to a much wider understanding of disease processes generally, but to the identification, on a structural basis, of many new types of disease. In some cases the recognition of the pathological anatomy gave a clue to the etiology of disease, as for example in inflammatory affections of mucous membranes or conditions in which deprivation of blood supply was an apparent factor, but the object especially of pathological anatomy was the definition and description of disease, not its causation.

It is evident, of course, that varied and minute studies of pathological anatomy prosecuted with an eye single to structural changes could easily become a narrowing influence in the larger study of disease as a whole by giving undue significance to local lesions which in a fuller analysis would appear of subsidiary importance, or even quite secondary, if not indeed of postmortem origin. The too ardent study of pathological anatomy tended therefore toward creating in medical thought the impression that anatomical changes of one sort or another in various parts of the body constituted separate diseases, and though a broader conception may have been held by some pathologists, who can deny that in the heyday of pathological anatomy local manifestations of a single disease were commonly regarded as independent entities?

Fortunately, during the later portions of the century of morbid anatomy's dominance, physiological investigations bearing directly on clinical problems made their appearance, and though interrupted in their promise of usefulness quite recently by a more powerful and productive branch of medical science (bacteriology) physiological methods gave to the medicine of the middle of the Nineteenth Century something of a drift away from morbid anatomy. Factors in disease other than those due to gross changes of structure began to be appreciated, as studies like those of Claude Bernard indicated. Thoughtful investigators became engrossed with considerations of functional pathology as opposed to the prevailing conception of an anatomical foundation for all diseases, and though the methods available fell short of establishing functional pathology fully, a beginning, at least, had been made when the advent of bacteriology interrupted this branch of medical progress by introducing an entirely new and most productive approach to the study of disease.

Some of us here recall the earlier days of this new medical science, and almost all of us have lived within the period of its greatest activity. It is therefore unnecessary for me to detail any of the steps in the history or development of this most fruitful field of etiologic study. One after another pathogenic micro-organisms were identified with almost bewildering rapidity, and the age-long search for the cause of all disease at times seemed to be within reach. As has been usual in all branches of science, this novel method of investigation for the time-being predominated and overshadowed older forms of research; but the brilliancy of the results more than justified its temporary monopoly of interest. Not only were new causes and processes of disease uncovered, but methods of prevention and of cure, that not even the most captious critic may question, were firmly established. Furthermore, one must recognize as one among many of the achievements of bacteriology the revelation of the fact that through the operation of a single direct cause (bacterial dissemination) widespread pathological changes may be produced within the body, and that a reclassification of diseases (as these had been subdivided on anatomical grounds) could be profitably undertaken. That scrofula, lupus, hip joint disease and pulmonary phthisis are all demonstrably outcroppings of a single infection was certainly a great advance in medical knowledge, particularly in the direction that I have under discussion here, the ultimate diagnosis leading to appropriate treatment. It cannot, however,

be doubted if one reviews the story of bacteriology in a candid spirit that the quest for specific causes of disease to the exclusion of other factors has at times had a reactionary effect upon the larger question of the proper interpretation of disease as a whole. This is particularly true in the domain of diagnosis and treatment where, as I shall have occasion to indicate later, the too circumscribed attention given to micro-organisms and their activity has at times prevented a broader understanding of the reactivities exhibited respectively by the parasite and the host.

Within the last two decades significant advances in medical study have been made by the introduction of practically (clinically) usable methods of chemical, physiological and physical investigation of disease; and our present available sources and means of information embrace a wide range of established practice. We find ourselves in a period in which earlier and less productive discussions of functional versus organic disease may be reconsidered from new standpoints, and in which more definitely the functional disorders incident to organic disease are beginning to be determinable. The newer sciences (so far as practical medicine is concerned), chemistry, physics and physiology now occupy the center of the stage, and for some time to come may be expected to yield the richest rewards. Let us not forget, however, that here and there where some earnest worker is still pursuing older methods, new and it may be revolutionary facts may be discovered.

I have mentioned briefly these historic periods or epochs in the progress of medical study only for the purpose of indicating that a bewildering multiplicity of "diseases," disease processes, pathologic states or conditions have been the result and of suggesting that either hasty generalizations or implicit acceptance of the finality of the data may lead us into grave error. The medical investigator, like any other scientist, working in a single field, may properly push his adventures as far as he can along his own lines of exploration and may be rewarded as many have been by rich discoveries; but the practical clinician to whom I am especially addressing myself must seek to extract from the confused picture that which seems best to form a harmonious design. We need for medical advancement, first, great observers, then investigators, and finally the even rarer characters, great interpreters. Hippocrates, Sydenham and Rush, to take long steps in the medical story, typify the class of observers; Harvey, Pasteur, Ehrlich and Koch were pre-eminently investigators, while Virchow, Wunderlich, and among us, Osler, distinguished themselves especially as interpreters. Comparison of merit should not be attempted and cannot be made between men of these separate groups. There have been greater biological investigators than Darwin and Huxley, but never greater interpreters.

In medicine, we have greater and more pressing need of periodical interpretation than in less practically applicable branches of science, for the need is ever present, and in the changing conditions resulting from the various forms of investigation it would be hopeless for each of the army of medical practitioners to undertake his own interpretation. If we mass in one heap all the suggested "discoveries" regarding the nature of disease and disease entities, derived from anatomical, bacteriological, physiological and other methods of study, there results either a kaleidoscopic pattern with spots of dazzling brilliancy or a cubist design to affright the soul, according as the arrangement may be altered. Believe me, it is not in any strained attempt to find figures of speech that I make this statement, but only to indicate that the very complexity of modern discovery may lead to more confusion than help in practical medicine, unless we are careful in acquainting ourselves with the real significance of successive advances in knowledge and exercise discrimination in our allotment of importance to the respective facts discovered. We must to a considerable extent function as individual interpreters until we have found an outstanding interpreter who will clarify for all the confused mass of data. Bacon said "the mass of our knowledge has become the cause of our indigence" and surely the clinician who, without discrimination, accepts and adopts as a basis for his practical work every new thought advanced in medicine must be as helpless as a rudderless ship at sea.

To come a little closer to the theme I have in hand and to emerge from generalities, I am sure it is clear to every practical clinician that the numerous conditions modern medicine and clinical methods enable us to discover make the task of bedside interpretation increasingly difficult. A comprehensive study of a clinical case, with the use of every possible method of investigation, old and new, may furnish a confused mass of information to one who has not cultivated any capacity for classifying and interpreting his data. Facts without relevancy may in these circumstances rise to positions of assumed importance and may crowd out of con-

sideration other and more certainly important matters. The clinician who undertakes to investigate cases by every known method (or, as is more common, to have them so investigated for him) and accepts each reported discovery as on a level of importance, is a poor clinician, just as poor a one as another who has but one method at his command and uses this as a universal yardstick.

The first object in the mind of the physician is, of course, the discovery of the patient's disease so that appropriate measures may be taken to cure it. It is, perhaps, unnecessary to say that we have long since outgrown the time when it was sufficient to be able to name the disease from which the patient was suffering and to apply a standardized treatment to it. Perhaps this may be permissible in the case of certain acute infections in which specific methods of treatment are available, but for most cases, acute, or chronic, varying conditions of the disease itself and some other variables that I shall presently mention, are as important as the localization or the name of the disease. A second matter of growing importance is that we shall never forget that a discovered pathological condition does not necessarily indicate the disease from which the patient is suffering. Those who have had any considerable experience in gross morbid anatomy (and all internists ought to have this) will recall how commonly a number of entirely unconnected pathological lesions are found at post-mortem examinations. In most instances, perhaps but one of these was in any way operative in producing the patient's immediate disease and his death. A wise clinician on obtaining evidence of any morbid condition naturally questions himself regarding the competence (in an etiological sense) of the lesion to produce the patient's disease, or the sufficiency of the morbid condition to cause all of the symptoms. To give an instance, physical diagnosis, symptoms and electrocardiographic diagnosis indicated that a certain patient had myocardial disease and auricular fibrillation, as he unquestionably had, but a lack of proper interpretation of other less conspicuous manifestations caused the failure to recognize a graver underlying disease until the patient's death and the autopsy showed he was suffering from carcinoma of the stomach. In this instance, too, concentrated attention to one line of study operated to occasion incomplete diagnosis; but in other cases a more thorough study could occasion an equally erroneous diagnosis, because a false emphasis was placed on some one discovered condition without the realization that this condition was insufficient to account for all the facts of the case. How often are conditions of uncertain pathological significance elevated to the position of the major cause of disease! A dropped stomach, a movable kidney, a colitis of doubtful seriousness or actuality, or a cardiac irregularity, how often is one or another of these found in an obscure case and falsely regarded as the significant morbid condition!

It is clear beyond discussion that no one or all avenues of approach can invariably lead to the solution of our diagnostic problems and that no acumen in the present incompleteness of our knowledge can infallibly determine whether a discovered condition of a certainty accounts for the patient's disease; but there is one method of consideration of clinical problems that requires greater emphasis in this connection than those of us who are hospital physicians or specializing internists or consultants sometimes give it. This is the study of the man himself, his antecedants, his habits and his environment. Family physicians intimately acquainted with the patient have a great advantage in this respect and are therefore often more correct in their interpretations. We are somewhat too greatly engrossed in our methods and too little concerned with the patient. We must return to the careful history-taking of the old clinicians and utilize the data so obtained in conjunction with all the clinical findings that modern methods make available. How often do we find a wholly erroneous diagnosis of a case (even after painstaking investigations had been made) immediately corrected by the discovery of an item of history that had been overlooked or concealed!

This, of course, is a commonplace of experience, but I make the statement because it seems apparent everywhere that clinicians are so keen in their devotion to their clinical methods that they seem almost to disdain availing themselves of the information a careful clinical history will give.

The finally important clue to diagnosis may be found in the physique, heredity, environmental conditions, habits, diet, exercise or occupation of the patient rather than in some discovered pathological condition from which for the moment he may be suffering, or may seem to be suffering. We are so impressed with the necessity of naming diseases that we would hesitate to record as a diagnosis, chronic fatigue, loss of sleep, mental overstrain, undernutrition or overnutrition, when we are able to apply a path-

ological label to a patient's case. In practice, this zeal to ferret out the lesions of disease and our trained capacity to do so with the aid of many clinical methods to an extent tends to create in our minds blind spots that deprive us of appreciation of the fact that back of multitudes of superficial manifestations of disease lie conditions in the individual or in his environment that may be far more important than the direct causes or forms of present disorders, the relief of which, however desirable, leaves the major problem of the patient's case wholly untouched. It is especially in the great group of functional and psychic derangements without definite organic basis but also in chronic diseases of many sorts that diagnostic investigations should follow this line of thought.

My plea for more intensive study of the patient as a vulnerable object or personality applies even to the seemingly extreme case of infections, in which it would at first thought appear as if the pathogenic organism constitutes the all important etiologic factor, the effects of which are direct, immediate and inevitable. Accumulating experience, however, shows by its disclosure of the frequent occurrence of natural immunity that the reactivity of the individual is often quite as important a factor as the pathogenic properties of the invader. There may be micro-organisms against the action of which individual resistance or non-susceptibility may be so common that it may indeed be said, as has been suggested by some, that the individual is specific rather than the microbe. On the other hand, there are not wanting data derived from clinical observation that higher grades of vulnerability exist in certain people, or may be developed in them under conditions of life by reason of which they become susceptible to various infections and fall victims to one after another unless through hygienic or other corrective measures some degree of resistance is restored. No practical clinician would doubt the probable correctness of this statement as applied to individuals undernourished, overworked and otherwise depressed, or the conclusion drawn from it, that proper medical treatment must take cognizance of the underlying fault quite as much as of the immediate infection.

Suggestions that men are structurally or in some other ways especially prone to other than infectious diseases is, of course, no new thought. It has long been repeated by medical writers that emphysema of the lungs is perhaps due to a congenital lack in its elastic tissue; it has been suggested in a semi-serious way that families in which arteriosclerosis develops frequently are possessors of a poor quality of "arterial gum;" and old-time clinicians emphasized physique as important in creating susceptibility to pulmonary tuberculosis. Temperament and constitution or physical structure occupied a large part in the speculations regarding disease of medical writers of the past; but we have only recently had a revival through more extended and accurate biometric methods of such studies of the individual as bearing on susceptibility to disease. It may be too early to state confident opinions, but that there is distinct promise of future recognition of identifiable types with specific susceptibilities is certain.

Among the influences acting upon individuals to produce susceptibility, heredity is most important and is without doubt operative in a much wider field than that which is occupied by the small number of admittedly hereditary diseases, such as hemophilia, color-blindness, certain forms of amaurosis, hereditary ataxia, splenomegaly, and the like. There are beyond these evidences of hereditary outgrowths that may become manifest in a variety of diseases rather than in a certain disease. This is seen in allergic conditions, certain skin diseases, disorders of metabolism and of the endocrine glands as well as in the complex derangements of the nervous system of familial origin. How much further hereditary influence will be traceable as an etiological factor in disease is a problem which the clinician of today and of the future must solve. Old-time beliefs in the heredity of some important diseases, infectious and organic, have to a large extent been disproved and have certainly contributed no data of use in the clinical study of obscure cases. They have perhaps had the reverse effect in giving overemphasis to certain possibilities of diagnosis that could not be sustained. I refer to the supposed heredity of tuberculosis, carcinoma or kidney disease among other conditions. One need not deny the possible influence of heredity in such diseases, but at the present day there is at least no warrant for stating it strongly or regarding it as a useful fact in diagnosis.

There are, however, large numbers of conditions in which heredity may be either manifest or, if concealed, discoverable on close study. In addition to those I have alluded to recent years have added several blood diseases (such as splenomegalic hemolytic jaundice and sickle cell anemia) and these, like the allergic conditions and endocrine or metabolic disorders, may be concealed until carefully looked for. There

seems to be a wide field for study of hereditary potentialities that may become increasingly important in directing the physician's attention to latent disease in other members of the family of the patient under observation. The possibility of most useful preventive medicine suggests itself in this connection. It is scarcely necessary to do more than to hint at the wide range of relationship of heredity to psychic and psychoneurotic conditions and to suggest that the family physician and the internist long before the neurologist or psychiatrist have an opportunity here of applying preventive as well as curative measures to the actual or potential patient.

As disease is commonly, if not always directly or indirectly an expression of reaction of the individual to his environment, it is important that we should consider the surrounding conditions more earnestly than is customary, both from the standpoint of prevention and cure, and as possibly disclosing the real difficulty, if not the disease, under which the patient labors. Our greater knowledge of disease itself has somewhat led us away from such studies and has to this extent narrowed our view. It has, therefore, seemed to me worth while to present these thoughts for your consideration, and especially to make a plea for greater care in the study of the man himself, for thought regarding all the antecedent conditions that may have made him liable to disease in general or to a particular disease, and for greater discrimination in deciding that some discovered abnormality in a patient is really the cause of his disease or a factor in it. Breadth of view as well as the cultivation of all the methods of clinical investigation are essential to the clinician, and specialization so valuable as a modern development in practice must not be allowed to develop the latter at the expense of the former.

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SIGNIFICANCE OF BLOOD PRESSURE IN CIRCULATORY DISORDERS OF THE EXTREMITIES

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The individual who has circulatory disease of the extremities plus a high blood pressure almost never develops a gangrenous limb. He may have part, or even all, of his main blood channels entirely occluded; but he will rarely present serious clinical manifestations of his disorder. This curious phenomenon is due to the fact that, coincident with the destruction of his normal arterial pathways by reason of such disease processes as may attack them, his great blood pressure has developed a system of collateral blood channels that take care of the situation quite adequately.

Conversely, the individual who has a low blood pressure gives clinical evidence early, of such vascular disease as he may have in his extremities and only too frequently comes down with actual gangrene. And the lower his pressure, the earlier the symptoms, the more acute the process, and the greater the danger of gangrene. This is due to the fact that the needed system of collateral blood channels fails to be developed because of a blood pressure that is too low to do it.

Between these two types, the high-pressured individual on the one hand and the low-pressured one on the other, there is a third which shows a pressure that is apparently high but in reality is low, or at least too low for the situation as it is found to exist. In other words, there is a third class in whom one finds a falling pressure, or a condition that amounts to the same as a broken cardiac compensation. The blood pressure of these patients seems high and in certain cases is high actually as measured by the norm, but investigation will show that it was higher, considerably higher in some instances, and during this time there was no trouble with the limbs. The trouble began when, following some illness or some accident, or perhaps a failing myocardium, the pressure began to give way.

With this preamble, it may be permissible to say that too much attention has been directed toward the pathological findings in circulatory troubles of the extremities and too little toward clinical features that, if properly understood and evaluated, might be very helpful in diagnosing these maladies earlier and in affording relief. It might be different if it availed anything to differentiate between the disturbances that come as a result of sclerotic processes, thrombo-angiitis obliterans, endarteritis obliterans, the late stages of Raynaud's disease, etc. But it does not, except in isolated instances. They all point toward one thing, gangrene, and they all approach this end pretty much in the same way, that is: by way of great suffering, much loss of sleep, increasing disability and ulcerative processes that tend to pass over into actual gangrene.

It can hardly be said that we have made great

advances in treating these conditions. Their very nature, of course, is against them and is in part responsible for our helplessness. It is awfully difficult to support a failing circulation, much less provide some substitute for one that is all but gone. But we have not attacked the problem intelligently, and it may be that if we change our tactics much may be done by way of prevention and more than we think by way of cure, or, at any rate, relief.

I therefore wish to call attention once again to the real importance of the blood pressure in these maladies. I made a note of it some four years ago in a paper that appeared in the *Journal of the American Medical Association* under the title, "Blood Pressure Findings in Circulatory Disorders of the Extremities,"[1] but apparently the article attracted little notice. Even so, if one will take the trouble to investigate cases of this sort carefully, it will become apparent very early that the worst cases are those having the lowest blood pressure; the best, or those that become stationary and get well or as well as things of this sort can get, are the ones that have the highest blood pressure, and the intermediaries are those that have a falling pressure.

We do not know what causes the processes that occlude the blood vessels any more than we know what will stop them. Various theories have been presented, among them that of infection, but nothing has been proved. We do know that, with the exception, perhaps, of the aged sclerotics and the diabetics, most of the sufferers are men, frequently foreigners, Russians, or of Russian descent especially; that many of them are comparatively young men in the thirties or forties, and that they are usually perfectly healthy specimens except for the one complaint. Rarely does one find syphilis. Women have troubles of this sort, too, but most of it is found in men. The lower extremities are usually attacked, usually the left leg first, but at times only the arms are affected. In rare cases, all four extremities are attacked at the same time.

Certain other things are known. Most of the men are great smokers. How they love cigarettes! Many of them have bad teeth. Their blood and urinary findings are pretty much normal. Pain, much pain, is the commonest complaint. Then come disability and ulcerations about the nails of the toes or fingers, muscle atrophy, invalidism. But nothing that we know has the slightest etiological significance or fundamental interest except perhaps the state of the blood pressure and no other one feature or group of features points the way more clearly than does the study of this element.

It takes a certain amount of force to propel the blood through its normal channels. What more natural, then, than to suppose that it takes a greater force to propel it through diseased and narrowed channels and a still greater force to open up new ones. That, in my opinion, is the crux of the whole affair. For some unknown reason, most of these unfortunates have not a blood pressure of sufficient force to protect them. It may even be that their low pressure has much to do with the starting up of the occlusive process in the first place by reason of inadequately filled terminal arterioles and venules that permit of a sluggish blood flow which in turn favors clot formation. It is even within the bounds of possibilities that the disease causes the lowered pressure. One cannot say. But whatever the case may be, there can be no question that the blood pressure necessarily plays quite a role in these vascular affairs of the extremities. It follows, therefore, that we will take a more intelligent attitude toward the situation if we give closer attention to the element in question and direct our therapeutic efforts toward trying to elevate it, or at any rate toward sustaining it if it is falling.

A blood pressure of 120/70 may be within the normal limits for a man of 52, but normal or not, if he has an advancing thrombotic process affecting the arteries of his legs, it certainly is not adequate. And if the process does not stop, or if his pressure cannot be raised, a gangrene will almost certainly come to pass.

This is the predicament Mr. S. F., recently seen at the Sinai Hospital, finds himself in. And it is most precarious, too, because he has already lost one leg from the same process, thrombo-angiitis obliterans, that now affects his remaining leg.

Quite different is the predicament that Mr. J., recently seen at the Johns Hopkins Hospital Dispensary, finds himself in. Sixty-four years old, he has a systolic blood pressure of 190 mm., to all intents and purposes certainly high enough. Yet he has increasing pain in both lower legs, cannot sleep, and of late has had to give up his work, which is that of park policeman. There is no pulsation in the arteries of either leg below the femorals. His radials are of the typical pipestem variety, and one of them does not pulsate at all. In addition, the man has recently become quite short of breath. He is obviously one of the high-pressured individuals in whom a break has appeared. Either he

1. Bernheim, Bertram M.: Blood Pressure Findings in Circulatory Disorders of the Extremities. J. A. M. A., vol. 78, March 18, 1922.

had a pressure higher than 190 and this developed and sustained his collateral circulation, for experience tells us that the arteries in his legs have long since gone out of commission, until it broke, or the 190 level was so high that his heart began to give way. In any case, the thing to do is to rest him in the hope of restoring his myocardium so that there may be maintained a blood pressure level of such proportions that his collateral blood circulation will once again function adequately. There is nothing to do locally except, perhaps, some massage, baths, and heat applications.

With regard to the first case, Mr. S. F., a different course will have to be followed. He really has not much of a collateral circulation, and with a blood pressure of 120 systolic he is not liable to develop one. This man is advised to rest in bed, too, but more with the idea of building up his general condition, which is much below par. He is to have warm baths for his foot and gentle massage. And perhaps he will be given a bit of the new pressure-raising ephedrin. But in addition, he is advised to undergo a peri-arterial sympathectomy. This procedure will not raise his blood pressure, but by dilating such arteries as he still has (only his dorsalis pedis is gone) it may make his pressure more adequate. If, therefore, the rest and general treatment regime should raise his pressure a bit, as it sometimes does, the sympathectomy may be just the one additional element needed to save the limb.

That this is not a fanciful hope is well illustrated by the case of Mr. B., aged 68, patient of Dr. Thomas R. Brown, who was seen at the Church Home and Infirmary some ten months ago. He had a generalized arteriosclerosis, a systolic blood pressure of 136 mm., no pulsation in the arteries of his left leg below the femoral, and was suffering horribly. He had not been in a bed for weeks, and such sleep as he did get was obtained in cat-naps while sitting up in a chair. He had had excellent medical attention and had been away to one of the better-known watering places without obtaining relief.

A pressure of 136 may possibly be quite the normal thing for the average sclerotic of 68 years, but it most certainly was not adequate for this one. He was put to bed and kept there by the use of narcotics and very carefully prepared for operation. I know full well that the peri-arterial sympathectomy is not supposed to help matters in arteriosclerotic vessels, but it was either this or an amputation for Mr. B., and he chose operation. It was done for the most part under local anesthesia, but the artery was awfully brittle, there were many plaques in its wall, and the adventitia was both thick and unusually adherent, so I had a bit of ether administered during the arterial manipulation in order to avoid any accident.

There was complete relief of pain in this case and at times one could obtain a suggestive pulse in the popliteal artery. But, best of all, there was a systolic pressure some weeks later of 146. Mr. B. is engaged in his usual business now and thus far has had no further trouble.

It is just possible, of course, that some individuals require a higher pressure to develop a collateral circulation than do others. More than likely the state of the tissues has something to do with this, and perhaps the degree of tightness of the skin. It would seem that a high degree of elasticity and less tightly enveloped tissues would require less pressure to force blood through new channels than would the tightly enclosed fibrotic tissues. I mention this because upon occasion one comes across a case where the pressure seems to be all that could be desired, yet there is little or no collateral circulation and all efforts to develop one fail. Mr. A., aged 35, is a case in point. Suffering from thrombo-angiitis obliterans, he had a pressure of 128/75, but it was too low. He lost both of his legs.

One of the most interesting cases, though, that I have ever seen, and one that is especially suggestive as regards the importance of the blood pressure theory I am propounding, was that of Mr. L. T., aged 68, patient of Dr. L. F. Barker, for whom I saw him. This gentleman, a Russian by birth, gave a story typical of thrombo-angiitis obliterans covering a period of fourteen years. The trouble began in the left foot and went through the gamut of pain, discoloration, atrophy of the muscles, ulceration of the toes, loss of substance, invalidism. Later, the right leg became similarly affected. In spite of it all, the patient gradually improved and was able to get about fairly well. He continued thus for some years but finally began to have difficulty in walking and cramps in the calves of both legs, for which he consulted Dr. Barker.

On examination, this man was found to have a right femoral artery pulsation, but no other palpable pulsation in any other vessel of either leg. Yet there was no gangrene, no ulceration. The tips of several toes were gone, the feet were rather cool, the skin covering of the feet was awfully tight, and there was atrophy of the calf muscles. It was all a bit difficult to understand till one found that his blood pressure was 180/85. What had happened was apparently a gradual rise of pressure, the patient vouchsafed the information that it had been around 150, as the major blood vessels went out of commission. And it was this pressure that was sustaining the man's collateral circulation. With increasing age and increasing vascular disease, what more natural than that there should be some difficulty in locomotion? I suggested that every effort be made to sustain the elevated blood pressure, since, in my opinion, this was all that was preventing frank gangrene.

Another case is that of Mr. B. C., aged 43, upon whom I did a peri-arterial sympathectomy in 1923, first on his right femoral artery and then on his left one. He was suffering from a severe case of Raynaud's disease as was manifested by the usual color changes, spasmodic vessels, great pain, and gangrenous toes on both feet. His blood pressure then was 154/94 and rather high at that. Following operation, in each instance there was marked relief of pain and very gradually the tips of the affected toes sloughed off and healing took place.

Altogether the patient was incapacitated nineteen months, but he finally recovered to such an extent that he has gained in weight, he has no more pain and is able to work. His blood pressure now is 192/112, and I attribute much of his improvement to the rise that has taken place. The sympathectomy probably tided him over the acute stage.

Other cases could be cited, but the ones mentioned are certainly sufficient to suggest that the

blood pressure findings in circulatory diseases of the extremities are of real importance. I personally am in the habit of basing my prognosis more on this one feature than on all others combined, and it is my custom to scan the blood pressure chart, in cases under treatment, with real interest, for I know full well, from experience, that a falling pressure spells disaster, a steadied pressure gives hope, a very low pressure means trouble, a rising pressure, provided things have not gone too far, means recovery.

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THE EARLY DIAGNOSIS OF TUBERCULOSIS IN CHILDREN AS A MEANS OF CONTROLLING THE DISEASE*†

By HORTON CASPARIS, M.D.,
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The great amount of energy that has been spent during the past ten or fifteen years in fighting tuberculosis has markedly reduced the number of deaths from the disease, but has not proportionately reduced the number of individuals suffering from tuberculosis. It is the disease, it is the long months and years of illness with incapacitation and the great expenditure of time and money of others in caring for the tuberculous patient that constitute the real burden in tuberculosis. And, while caring for the individual who has already developed the disease will always be an important and necessary phase of our work, it seems quite clear that our hope of lessening the severity of the tuberculosis problem lies in preventing the development of the disease.

There are two general explanations for an individual's developing tuberculosis. First, he may receive an overwhelming infection at the beginning. Second, his general physical condition at any period of time may become so below par as to render him unable to resist the flare-up and spread of a milder tuberculous infection which has been dormant or walled off since early childhood. The first mode of developing tuberculosis is less frequent. We try to prevent it: that is, we try to prevent the massive infection of individuals by properly isolating at home or in a sanatorium the source of massive infections, namely, the individual with active open tuberculosis. The infant who comes in intimate contact with some tuberculous member of the family is the most frequently encountered victim of this mode of development of the disease. The second mode of development includes far the greater number, and this is fortunate, for it is more readily attacked. This type of tuberculosis develops because the individual is in a general run-down condition. His previously quiet and often unsuspected tuberculous focus of infection, through his poor physical condition is permitted to get the upper hand and spread. One rarely sees a vigorous healthy adult develop tuberculosis. Our method then of preventing this mode of development of tuberculosis is first to find the infected individual before he develops the disease and then to keep him in good physical condition and thereby prevent him from developing tuberculosis. It is chiefly by this means that we may expect to reduce the incidence of the most widespread and incapacitating disease of children and young adults. We shall at the same time teach the fundamentals of healthy living and incidentally prevent many other less severe diseases.

Our most fruitful field of attacking this problem is among children because it is in children that infection with the tubercle bacillus usually begins. And, if we teach healthy living and prevention to the child we are taking advantage of the most impressionable age period when education is most effective.

Our specific method of attack is as follows. Whenever we see a child who has been exposed to tuberculosis or one who has symptoms or physical findings which suggest tuberculosis, we make an intracutaneous tuberculin test. For this we use old tuberculin so diluted that 0.1 c.c. of the dilution contains the amount of tuberculin we wish to give. As a routine we use 0.1 mg. of tuberculin. In cases of suspected phlyctenular conjunctivitis, skin tuberculosis, and recently developed tuberculous foci we give only 0.01 mg., because in such cases the larger amount usually produces too violent a reaction. In each instance where tuberculosis is suspected we do not consider the case negative until we get a negative test with 1.0 mg. of tuberculin and in exceptional cases with as much as 5.0 mg. In 90 per cent or more of infected individuals one will get a positive reaction to 0.1 mg. of old tuberculin given intracutaneously. The intracutaneous test is given preference because with the Pirquet test one gets only 50 to 65 per cent positives in infected individuals.

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†From the Department of Pediatrics of Vanderbilt University Hospital.

I have gone into detail in regard to the tuberculin test because it is the only certain means one has of determining whether or not an individual has been infected; also, because in addition to its giving us evidence of tuberculous infection which often could not be proved by any other means, it not infrequently has enabled us to rule out tuberculosis as a cause of subacute or chronic lung infections when an accurate diagnosis was essential to proper treatment.

Having found that a child is infected, one's surest means of determining the extent of involvement is by x-ray. Except in advanced cases one receives little information from symptoms and chest examination, since symptoms are not specific and the chest examination is usually negative.

Even though one usually finds the chest examination negative, we do not wish to underemphasize the importance of a careful physical examination. It is only through a complete physical examination that all of the defects are found, and it is the removal of these defects which so often enables the child to improve physically to the extent that he is almost certain to be able to control his tuberculous infection. We consider every infected child a potential case of tuberculosis.

Although the symptoms we get from the history are usually not pathognomonic, the history is important from many angles. From it we often learn of the source of infection. It tells us of the child's previous care and environment, and it tells us of other members of the family or of associates who might likewise be infected. Further, it is through information obtained from the history that we are enabled to give directions and carry out corrective measures which may be essential to the child's welfare.

As a concrete illustration of our method of approach, let us use as an example a family which we consider typical.

A child, aged one year, was brought to us by its mother. After going through the routine for diagnosis, we concluded that it had general miliary tuberculosis. (Tuberculin test positive. X-ray positive.) The infant was admitted to the hospital where it died two weeks later. Here then was an infant with an overwhelming tuberculous infection. It must have become infected from some member of the family with open tuberculosis. From the history and on investigation it was found that the father was suffering with moderately advanced tuberculosis. The father, having open tuberculosis, was considered quite dangerous to the other four children. He was therefore sent to a county sanatorium. Coincident with the investigation and procedure which we have just mentioned, the other four children were examined to determine first whether or not they had been infected and, if so, the extent of their tuberculous involvement.

The youngest child, aged two, had no symptoms nor positive physical findings except that he was 4 pounds under weight. The fact that he had been fed almost entirely on a milk diet we felt might explain his undernutrition. Chest examination was negative, but the tuberculin test was markedly positive and an x-ray of the chest showed increased root infiltration with some widening of the mediastinal shadow. Detailed directions were given for placing him on a general diet. He was to be brought in every two weeks for observation.

The next child, aged 4, was 15 per cent underweight according to the standard height, weight, age table. He had adenoids with huge chronically infected tonsils, and had a history of being particularly subject to colds with occasional earaches. With his colds he usually developed a cough, which cleared up slowly. The chest at the time of examination was negative. The tuberculin test was positive and an x-ray plate of the chest showed increased infiltration in the root regions. His diet was regulated and as soon as arrangements could be made his tonsils and adenoids were removed (two weeks later).

The third child, a girl aged 7 years, was 12 per cent under weight, had a slight dry cough which she had had for about two months, gave the history of getting tired very easily, but did not have definite afternoon fever. She had several carious teeth. The chest examination was negative. The tuberculin test was positive. The x-ray examination showed marked involvement in the right upper mediastinum with infiltration extending out into the lung. The carious teeth were taken care of by the dentist. Directions were given that she should take a nap or lie down and rest each day at two o'clock, that she should never run and play enough to get tired, and that she be careful not to eat between meals anything that would in any way interfere with her appetite for her regular meals.

The oldest child was a boy, aged 9, who was normal except for chronically infected tonsils and a history of sore throat several times a year. His chest was negative and his weight was practically normal. His tuberculin test was positive and his x-ray plate showed increased root infiltration. His tonsils and adenoids were removed.

These children were all kept under observation and in six months the first three were markedly improved in their general condition. They not only showed striking improvement in their nutrition but also showed a decrease in x-ray shadows. The oldest boy remained in good condition. Six months later or a year after their first examination all of them were in good physical condition.

Detailed review of this family shows that one has to use all of the means at his disposal to diagnose and care for tuberculous children.

In such a manner as I have indicated we have followed approximately four hundred children over a period of from one to five years. Their tuberculosis ranged all the way from advanced pulmonary disease to mere tuberculous infection without demonstrable symptoms. The latter constituted the great majority of the cases. Even those children who have had rather a large

amount of lung involvement have shown astounding ability to care for their tuberculosis. Of course many of the sicker ones die, but many improve. Those with a moderate amount of involvement usually improve and it is quite rare to see one with tuberculous infection and few or no symptoms, develop active disease. Some of them have reached puberty and many of them have gone through acute infections such as measles and whooping cough without bad results. Nearly all have gained not only in weight but in most instances have shown actual reduction of their lung and gland involvement as indicated by x-ray.

SUMMARY

In the fight against tuberculosis there has been a reduction in the number of deaths but not a proportionate reduction in the incidence of the disease. The months and years of illness with incapacitation together with the money and time of others spent in caring for the sick constitutes the real burden in connection with tuberculosis. Therefore, in the prevention of the development of the disease lies our hope of lessening the severity of the tuberculosis problem.

We prevent the development of tuberculosis: (1) by so isolating the sick individual with open tuberculosis that he will not massively and overwhelmingly infect others; and (2) by keeping those infected individuals who have not yet developed active tuberculosis in such good physical condition that their chances of developing the disease are practically eliminated.

This work should be carried out chiefly among children because it is in childhood that tuberculous infection usually begins. Then, too, prevention means education, and it is during childhood that education is most effective.

A plan of actually attacking the problem is outlined, and a concrete illustration is given using a typical tuberculous family as an example.

Approximately four hundred children have been followed over a period of from one to five years. Those with active disease have shown astounding ability to take care of it. Those with mere tuberculous infection have rarely developed active disease.

DISCUSSION (Abstract)

Dr. W. S. Leathers, Nashville, Tenn.—The pediatrician holds a pivotal position in the control of tuberculosis since an average of about 70 per cent of all children become infected with the tubercle bacillus before they are fifteen years of age. In the control of tuberculosis, it is imperative to give more attention than has been given in the past to the health problems of children, especially the effect of intercurrent diseases and the debility produced by correctable physical defects. Many factors must be considered in a well rounded program for the control of tuberculosis, but the child health problem presents the greatest avenue for real service in prevention and eradication. Much has been accomplished in recent years in reducing the death rate from tuberculosis, but we are now approaching a stage in the fight against this malady which will require more intelligent planning and a more intensive attack. I am disposed to believe that the greatest need at the present time from the standpoint of providing institutional care is to give more attention to preventoria, open air schools and summer camps. Thousands of children are undernourished and underfed. They need building up, and yet there is no place where they can be sent in most communities. A few months under proper supervision will frequently tide the child over what may be termed the period of emergency in its life and be a means of preventing a weakened physical condition.

Dr. Oliver W. Hill, Knoxville, Tenn.—The incidence and the mortality from tuberculosis have been lowered, but the incidence of tuberculous meningitis has not been lowered in the last four or five years. The pediatrician who sees a case of tuberculous meningitis, tuberculous adenitis or arthritis should not only take care of the child but find the source of the infection. It may be a relative, or the milk supply. It is our duty to find where the infection came from and thus cut down the incidence of new cases.

Dr. N. C. Womack, Jackson, Miss.—Tuberculosis is a disease of infancy and early life, and the younger the child the more susceptible it is to the infection.

Very often the infection comes from the parent or grandparent, one or more of whom may harbor a healed lesion. Many grandparents, under careful questioning, will admit a slight early morning cough which to them is of small consequence, but they may carry sufficient trouble to infect a young baby on prolonged and intimate contact.

A child markedly under weight, with enlarged lymphatic glands, particularly the posterior and anterior cervicals, low hemoglobin, and relative lymphocytosis, should be carefully examined with the view of excluding glandular tuberculosis.

It is probable that children who are infected early in life develop a relative immunity which prevents their having the disease later in life as an acute condition.

The treatment consists in diet, rest, sunshine, ultraviolet ray, and other general hygienic measures.

Dr. W. B. Jameson, Augusta, Ga.—In the Pediatric Department of the Medical Department of the University of Georgia at Augusta, we have established well baby clinics, where we see children from six weeks of age up to six years, the pre-school child. On each visit we do complete physical examinations as well as give advice along the line of feeding, and we are endeavoring to educate mothers to take their children periodically to the private practitioner (those who are able to pay). We realize that the constant examination and observation of these youngsters will enable us to arrive at an early diagnosis of tuberculosis. In addition to the examination, we lay much stress upon proper feeding and correct hygienic measures, because it is an established fact that the well nourished child will probably not develop this dreaded disease. The private

practitioner should persistently urge the parents to bring their children to him for frequent examination.

Dr. J. H. Mason Knox, Baltimore, Md.—At the last National Tuberculosis Conference held in Washington in October, the possibility of a very radical anti-tuberculosis treatment for the newly born elaborated in the Pasteur Institute, Paris, by Dr. Calmette was presented to the conference by his co-worker, Dr. Weill-Halle. After some years of animal experimentation, they have been cautiously administering to certain new-born children an emulsion of tubercle bacilli so modified by growth through many generations on a mixture of ox bile and glycerin that, although living and capable of producing tuberculin and of stimulating antibodies in the human organism, these treated bacilli have lost all power of producing tuberculous lesions. This altered tubercle bacillus under the name of B. C. G. is utilized in creating immunity in newly born infants. An emulsion of one centigram of fresh culture containing about four million bacilli is fed to an infant by mouth in three doses two days apart, preferably on the third, fifth and seventh days of life. It is given mixed with a little milk. It is estimated that the mortality among young infants reared in a tuberculous environment, and subject therefore to repeated infection from open cases, is more than 25 per hundred in the first year. This preventive treatment, with the cooperation of physicians not only in France but in other European countries, has been given to several thousand infants born of tuberculous mothers, and a marked reduction in what would have been the probable mortality of these infants has resulted. This new procedure in the hands of well known and responsible men seems to be a reliable method of increasing the resistance to tuberculous infection among young infants.

Unquestionably the repeated and careful examination of children, particularly those who are under weight and who have been exposed to tuberculous infection, will lead to the detection of many early cases and the prompt institution of curative treatment. It is for this reason among many others that we should all support the so-called periodic health examinations for all age groups at more frequent intervals among infants and young children.

Dr. Casparis (closing).—In doing the tuberculin test routinely on all patients admitted to the children's department, we not infrequently get not only a positive test but definite radiographic evidence of tuberculosis where it is entirely unsuspected. This fact would indicate that the tuberculin test might well be made a part of every thorough examination. Such a routine procedure would insure our finding the earlier stages of tuberculosis in a greater per cent of children than by any other means. And, finding the infection at this stage enables us to prevent the development of the active disease in most cases.

I am glad Dr. Knox spoke of the work with Calmette's vaccine. If this method of immunization proves successful, it will go a long way toward eliminating the first mode of development of tuberculosis which I mentioned, namely, the overwhelming infection of the previously uninfected. As I understand it, this method of immunization does not, however, prevent the individual from becoming infected with the virulent organism, but merely enables him to cope with the infection in most cases. This probably means that later in life he will still be subject to a spread of his childhood infection whenever his resistance is lowered. Hence we shall always have to guard against the second mode of development of tuberculosis.

INDICATIONS FOR CESAREAN SECTION*

By Jas. R. Bloss, M.D.,
Huntington, W. Va.

In this short paper I shall adhere to the subject and omit discussion of technic or of the value of the classical, low, transperitoneal or vaginal methods of performing this operation.

The great majority of the members of the Southern Medical Association are physicians engaged in general practice. These men are doing the bulk of the obstetrical work in the South, and they will continue to do so for many years to come.

The great effort of the Section on Obstetrics should be to fix indelibly upon the minds of all men doing obstetric practice the importance of careful pre-natal examinations and observations. If we could but accomplish this, the oft-quoted statistics of 20,000 maternal deaths incident to child birth, and the annual infant mortality of 200,000, would begin to show a decided improvement. But much of this mortality is not due to neglect or ignorance upon the part of the medical attendant. Education of the laity is needed also.

To thoughtful members of the profession, and especially to those of us who are giving attention to this branch of the work, it is alarming to contemplate the large number of cesarean operations which are being done throughout the country. It seems that a "furor operativus," as Williams[1] put it, has taken possession of the profession. The fact that the technic of the procedure has been so worked out and asepsis so well developed gives a sense of security which leads to the performance of entirely too many operations of this type.

It is possible that were cesarean operations all done by men devoting their entire time to obstetric practice the number would be much less in the aggregate. At present too many operations are performed as the easiest solution of the obstetric dilemmas in which practitioners find themselves.

The indications for cesarean section may be divided into absolute and relative. Under the head of an absolute indication we naturally think first of the contracted pelvis. The mere mention of contracted pelvis brings to the minds of most physicians the antero-posterior flattened

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pelvis. The idea of a generally contracted birth canal with a true conjugate sufficiently great to be ample under other conditions is not thought of.

It is practically impossible to deliver a viable child of average size where the true conjugate is less than 7.5 cm. Therefore, we may regard this as an absolute indication for operation, provided the child is in good condition and the mother presents no contra-indications. She should not be infected from examinations, exhausted from prolonged labor, attempted forceps or versions.

In the careful pre-natal examination we must, however, insist that an examination of the interior of the pelvis be made. It often happens that we find exostoses. These may so diminish the capacity of the birth canal that again the indication is absolute.

The importance of the examination of the outlet of the pelvis has not, it seems to me, been sufficiently stressed by obstetricians in their addresses to various medical bodies. A bi-ischial diameter of 7 cm., unless the posterior sagittal is exceptionally ample, means usually extensive injury to the maternal soft parts from either laceration or episiotomy, but even greater is the danger to the living child. A consideration of the measurements of this plane of the pelvis should be emphasized in the study of the indications. I regard an index of the outlet of 25 or under as an absolute indication.

Again certain abnormalities of the soft tissues may absolutely indicate the abdominal route for delivery. Fibroid tumors in the lower uterin segment may obstruct the inlet, as may neoplasms of the adnexa.

Stenosis of the cervix or vagina, due to congenital abnormalities of development, injury or disease, as well as the end result of previous operations may at times be classified as absolute indications.

There is not so great a divergence of opinion concerning the absolute indications. A consideration of the relative indications will, however, at once provoke discussion.

First, of course, will come those contractions of the pelvis, which may be classified as borderline. If our pre-natal measurements of the true conjugate range from 7.5 to 8.5 cm., with a flat pelvis, up to 9 cm. in a generally contracted one, with an outlet index of 25 to 30, or even 35, then it is a question what course to pursue. The physician is exceedingly rare who can say absolutely that particular measurements are ample for the child's safe passage. The test of labor, so frequently mentioned in obstetric literature, should decide us in such circumstances. I agree with the advice of J. O. Polak:[2]

> "With a normal presentation and position, if after two hours of labor you have complete dilatation of the cervix with no engagement or advance of the head, then do a cesarean."

An examination of my personal records for some years back convinces me that had I selected the abdominal route of delivery rather than the application of high forceps, or the performance of version, I might have saved a number of infants. Section certainly would seem to be a safer procedure than either of the latter methods of delivery. A few obstetricians have developed an almost uncanny skill in the technic of version. Not many of us are so gifted as to possess this.

Placenta previa is usually considered a relative indication for cesarean section. It seems rather difficult so to classify it. If we have not a centrally implanted placenta in a pelvis of ample measurements, then other methods of handling the situation are to be preferred. If, however, the implantation is central with a cervix but slightly dilated or not at all, the child and mother being in good condition, or the mother losing blood freely, then the indication is absolute and not relative. The delay and shock necessary to dilate the cervix rapidly and deliver the child appear to the author to be a far more serious ordeal for the mother. Almost certainly the child will be sacrificed, and undoubtedly these unborn children are entitled to some consideration.

The question as to whether or not section should be performed in cases of premature separation of the placenta, the so-called *abruptio placentae*, depends altogether upon the particular case, and the judgment and skill of the obstetrician in charge. If it is discovered that this condition is developing and the cervix is not dilated, or in a condition to be very rapidly dilated and delivery completed, then the indication becomes an absolute one in the interest of the child. With a similar condition of the cervix and the mother rapidly developing a grave condition from loss of blood which cannot be checked, then the consideration for the mother necessitates the performance of a section at once, regardless of the fact that the child may be dead. Again it is the individual judgment of the physician in charge which is the deciding factor of greatest value, and there is no fixed obstetrical rule.

In the past many sections were done because of eclampsia. Because of the usually rapid cessation of the convulsions and generally a more or less rapid clearing up of the other grave symptoms upon speedy emptying of the uterus, we were taught to deliver by the most expeditious method available. A perfect frenzy seized many to perform sections for this condition.

As a result of more diligent study of the etiology and pathology of the toxemias of pregnancy and their treatment by medical methods, they are becoming far less important as an indication for operative methods.

We must recognize the fact, however, that regardless of careful pre-natal supervision, in spite of our efforts to treat these patients with the most approved modern methods, a certain number do not respond. Grave toxic cases will develop out of a clear sky, so to speak, in the last month or two of pregnancy.

The question of deciding upon the course to follow in that small percentage who do not respond to other than operative therapeusis, becomes a heavy responsibility. It has seemed to me that the shock and delay necessitated by the induction of labor and the delivery of the child per vaginam will cause a more serious situation than a rapidly performed section. The operation should not be delayed until eclampsia develops. We should operate before the convulsions occur if possible. The mortality following the operation if done in the pre-eclamptic stage will be much less. Personally we have found it necessary to operate for this condition five times in the past four years.

Naturally in the early months a termination of the pregnancy is advisable in those few instances where all other methods of treatment fail us.

Another relative indication to be mentioned is prolapse of the cord. Certainly this is a very rare condition; and in the great majority of instances other methods of handling this complication proved successful. Where reposition by posture and other expedients fail, then in the interest of the child the question of a section has to be considered. Here the experience and judgment of the physician must meet the situation.

The problem of deciding upon the course to pursue when a carcinoma of the cervix exists occasionally confronts us. It is rather difficult for the author to follow the reasoning that any pregnancies under such circumstances should be allowed to deliver through the diseased area. None of us would think of permitting it if the malignant involvement is extensive. Where it is not extensive the course to follow is more difficult to decide.

So far good fortune has attended our efforts, and this complication has not been met. When it is, unless unforeseen circumstances forbid, a section will be performed regardless of the extent of the malignant area.

It is exceedingly difficult for us to subscribe to the dictum that only contractions or obstructions of the pelvis justify cesarean section. There are grave constitutional conditions in which the life expectancy of the mother, and the probable effect of the labor upon this will demand a consideration of the performance of this operation. Under such circumstances only our judgment and the ethical problem involved can guide us.

What course to pursue in determining the method of delivery where serious heart lesions complicate the pregnancy occasionally causes much more careful thought. There are the cases with decompensating hearts where it seems that we are choosing the lesser of the evils if we undertake a rapid extraction by section. What course shall we take with a patient having myocarditis or an acute dilatation? Here again it may be that a rapid section offers the most encouragement.

In organic valvular lesions we find that the majority go through an ordinary normal labor satisfactorily if compensation is well established. Yet some of these will disappoint us if we follow the conservative plan.

Only a careful pre-natal examination and continued observation of a competent cardiologist will keep us in a position of safety. During the labor it may be that conditions may arise which demand a prompt termination. Under such circumstances cesarean section offers the most hope for a favorable outcome.

The matter of previous section and the necessity for the performance of subsequent ones in succeeding pregnancies naturally arises. In those cases where the original conditions still exist there can be no hesitancy as to its advisability. The mere fact that there has been a previous cesarean section does not in itself demand the performance of a second one. Very frequently these patients deliver themselves spontaneously with no deleterious effects.

Where the history of the previous operation is that of an uninterrupted afebrile convalescence, when the original indication no longer is existent, and with a pelvis of normal measurements, the probabilities are that a normal de-

livery will occur. The danger of rupture of the uterus at the site of the scar of previous section has very probably been overestimated. It is, however, a possibility to be borne in mind.

SUMMARY

(1) A true conjugate of 7.5 cm. is an absolute indication for cesarean.

(2) An index of the outlet of 25 or under is an absolute indication for the operation.

(3) Tumors of the soft parts and exostoses obstructing the birth canal, which are irremovable from below, constitute an absolute indication.

(4) Carcinoma of the cervix regardless of the extent of involvement should be an absolute indication.

(5) The toxemias of pregnancy which do not respond to modern methods of medical treatment constitute an absolute indication for section, which should be done before convulsions develop.

(6) A centrally implanted placenta previa with an undilated, or undilatable cervix, with uncontrollable bleeding, is an absolute indication.

(7) Border-line contractions of the pelvis constitute a relative indication for cesarean section to be weighed in consideration against high forceps and version.

(8) Premature separation of the placenta is a relative indication, as is prolapse of the cord.

(9) Certain grave constitutional conditions of the mother, together with organic lesions of the heart, are to be considered as relative indications.

(10) Previous cesarean section constitutes a relative indication only where the original reason for previous section no longer exists, and where the history of the convalescence from the previous section shows it to have been uneventful.

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DISCUSSION (Abstract)

Dr. E. C. Davis, Atlanta, Ga.—Sometimes the effort to pull a baby through a narrowed pelvis results in disaster. Under such circumstances the cesarean section may do away with some of the dangers to mother and child, but it is such a saving of time that it is likely to be abused.

Dr. Joseph E. Green, Richton, Miss.—I am a country doctor, and I have seen in the last few years many young men who wanted to do a cesarean section. They will do one at the first chance, whether it is indicated or not. If we take time, keep working, and refuse to become excited over the contracted pelves, very few cases cannot be delivered.

In most cases in country practice we have made several examinations before we decide upon a cesarean. Then if we load that mother in a Ford or other automobile and carry her over twenty or thirty miles of rough road and have a cesarean section done by some mediocre surgeon we are almost sure to have a double funeral.

Dr. H. W. Johnson, Houston, Tex.—I should like to take exception to the essayist's statement that severe toxemias of pregnancy are an indication for cesarean section. The toxemias should be divided into the two common forms: eclamptic and nephritic. The expectant treatment offers the best outcome in both forms, certainly in the eclamptic type where the onset has been rather rapid, in a patient with a previously normal blood pressure, when symptoms indicate that the pregnancy must be terminated. If we give ¼ grain morphin, and then very gently rupture the membranes, there is a rapid reduction in the blood pressure. It reaches a comparatively safe level before the onset of labor. The patient is then left alone, given small doses of morphin, and is assisted very late in the second stage of labor.

In nephritic toxemia where extensive changes have taken place in the kidney, rupture of the membranes will not be followed by any great reduction in blood pressure. Even in this type of case statistics indicate that the expectant treatment gives the best mortality. I will admit, however, that under certain circumstances this might be an indication for cesarean section.

Dr. W. T. Pride, Memphis, Tenn.—In Memphis we have different percentages of cesarean sections according to the man. Out of every hundred cases I have one cesarean section. A friend of mine has ten out of every hundred. I do not know wherein the difference lies. His indications seem to be all right, but I do not have those indications. I have never seen a pelvis, not deformed, through which a normal baby could not pass. I mean by deformity that there is such a large promontory that it constitutes a deformity. If the external conjugate measures 18, 17 or 16, that is not an indication. We had a case last year that was 15, measured by three men. The woman was delivered of a 7¼ pound baby without a laceration and without any assistance. Not infrequently a 16 inch delivers without trouble. We have a series which I intend to report some time in the near future of 1,400 pelves, some from the North and others from the South. We find that in the North the pelves are larger on the whole than in the South. The colored women are smaller in proportion than the white women. A colored woman who is born in the North has a larger pelvis than one in the South.

If a case is eclamptic, not merely toxic, and under treatment for twenty-four hours without improvement, a cesarean section is indicated. You have not lost time by treating this patient; you have gained a great deal because you have given her things which will help her kidneys, liver and intestinal tract, and elimination is taking place, so that when the operation is done better results are obtained. Many times a patient will come in from the country after being in labor for forty-eight hours, a probable cesarean section. The physician to get her there gives her a large dose of morphin.

About the time she reaches the hospital delivery is often spontaneous. What she needed was not a cesarean section but a dose of morphin. Everything becomes so tense, so tonic that the uterus will not dilate, and all of her muscles are in tonic contraction and the baby has not a chance to be born.

The pendulum usually swings too far one way or the other. If we use judgment and do the best for the patient, sections will be less frequent.

Dr. R. A. White, Asheville, N. C.—In the absolute indications for cesarean section it seems to me there is one condition that should be added, namely, occiput posteriors, when the membranes have ruptured and after prolonged labor there is no engagement of the head. If the membranes have not ruptured, a version is preferable, but we all know that it is a difficult operation with the uterus contracted and the liquor amnii gone.

The ideal situation when eclampsia seems unavoidable is to bring on labor, but when immediate delivery is the only method of choice four main groups may be considered: (1) primiparae before the seventh month, not in labor; (2) primiparae at or near term, not in labor; (3) primiparae, in labor; (4) multiparae.

Primiparae before the seventh month cannot reasonably be expected to deliver a living child; therefore, the only concern is the mother. It is not very difficult to dilate the cervix sufficiently to deliver the body of the fetus. Then if difficulty is encountered with the after-coming head the cervix may be incised or a craniotomy done. This seems preferable to cesarean, as the mother is in better condition for subsequent pregnancies.

The second group of primiparae at or near term not in labor present a different problem, since the life of both mother and babe are at stake. If an immediate delivery is to be done, the only choice is cesarean section.

The third group, primiparae who are in labor, assuming that the cervix is dilated or dilatable, can usually be delivered by the vaginal route.

The fourth group, which includes all multiparae, can practically always be delivered immediately by manual dilation and forceps, or version.

Dr. Bloss (closing).—A course of watchful waiting, in a great majority of instances, will guide us away from a cesarean section.

Dr. Pride's advice about giving a dose of morphin must be emphasized. Frequently we walk the floor mentally and say to ourselves, "I believe I will have to do a cesarean section, but first let us give her a little rest," and give a hypodermic of morphin. Two or three hours later we find that we need to hurry to prepare for the delivery, and that the cesarean section is not necessary.

Someone spoke of the occipito-posterior positions as being an indication for cesarean section. I have had little trouble with the occipito-posterior position if the amniotic sac has not ruptured. Usually I can turn these cases into the anterior position. If not, we may emulate Dr. Potter and one of our distinguished members, Dr. Rucker, and do a podalic version. I find the Pomeroy maneuver an exceptionally satisfactory procedure in changing an occipito-posterior position into an occipito-anterior.

Dr. White spoke of toxemias of primiparae before seven months. I did not mean, in my paper, to refer to patients who exhibited only blood pressure elevations. It is true that if we puncture the amniotic sac in such cases the blood pressure will come down. The type I have reference to is that profound toxemia beginning suddenly with headache more or less severe, eye symptoms, and casts and albumin in the urine.

Frequently mothers are so anxious to have a living baby that they plead to take a long chance. With these I try every therapeutic measure to carry them, if not to term, at least past the eighth month. After the eighth month I feel that I am justified in doing a cesarean in those cases where every medical therapeutic measure fails to clear up the symptoms.

I had never had a persistent transverse presentation that could not be converted to a vertex presentation, or could not be delivered by version until about six weeks ago. A patient came under my care who could not be delivered because of a contracted pelvis. The true conjugate was not over 2¾ inches. The child was transverse; dorsum posterior. The elbow could be felt through the slightly relaxed cervix. I had never seen this patient until she was brought to the hospital. When the condition was discovered on examination, an effort was made to bring about a proper presentation. This was impossible and an operation was done essentially for the contracted pelvis, and not because of the persistent transverse presentation.

POST-OPERATIVE CYSTITIS

By EDGAR G. BALLENGER, M.D.,
and
OMAR F. ELDER, M.D.,
Atlanta, Ga.

Reference to medical literature gives rather inadequate discussions of the cause or causes of the cystitis which follows operations for hernia, hemorrhoids, pelvic conditions in women, appendicitis, and so forth, when the bladder has become overdistended and uretheral catherization is required. The general assumption seems to be that an infection has probably been carried by the catheter. Although this may at times be a factor, it is not the primary factor in the majority of instances. The actual cause of the cystitis more frequently is trauma in the form of small lacerations of the mucosa from sudden overdistention of the bladder. These minute injuries afford an entrance for organisms passing either down from the kidneys or up through the urethra.

While it is difficult to prove absolutely that over-distention of the bladder is the essential causative factor in post-operative cystitis, the

view is strongly supported by the rarity of cystitis after operations when the bladder has not become overfilled and by the infrequency of cystitis from urethral instrumentation. Overdistention of the bladder always precedes this type of cystitis.

The mucous membrane when damaged by overdistention or trauma from chemical agents becomes a less efficient barrier against infection, just as does the injured epidermis. We are able to recall not a few conditions which tend to substantiate this assertion. Many patients with a partial or complete prostatic obstruction may catheterize themselves in a more or less careless manner often for a long period of time without developing cystitis. This seems all the more surprising since we know how prone patients with residual urine are to develop an inflammatory condition.

Small lacerations or injuries of the mucosa incident to rapid overdistention of the bladder are likely foci for the development or entrance of organisms which otherwise would not be able to set up the inflammation. If ascending infection carried into the bladder by the catheter were the primary cause of cystitis, urologists would see these inflammations more frequently from instrumentation such as the passage of sounds, Kollmann dilators, instillators or cystoscopes. We are all familiar with the persistent, though often mild, urethral infections frequently observed in the strictured urethra. Yet the repeated passage of instruments almost never causes cystitis.

When the distention of the bladder is gradual in onset, as in prostatic obstructions or tabes, the pavement epithelium grows as the residual urine increases and the minute lacerations do not develop as they apparently do in the rapidly distended bladders. The danger of prompt or repeated catheterizations is trivial compared with the danger of injury to the bladder mucosa by overdistention.

A somewhat similar condition occasionally seen is vaginitis in brides due to the trauma produced by coitus, which affords an entrance for the organisms normally present in the vagina. It is, of course, possible at times that the lowered resistance of the patient or the irritation of the bladder mucous membrane by the anesthetic may be contributing causes of cystitis. But, as we said, we recall exceedingly few instances of cystitis following operations upon patients who had no retention of urine, regardless of the anesthetic.

Post-operative cystitis is likely to be intractable and to cause so much discomfort to the patient that its prevention is of no little importance.

It would be a prophylactic measure worth while for surgeons to leave a standing order after operations for more careful observation of the patient's bladder by the house surgeons, internes, and nurses in order that the bladder may be emptied before harmful distention occurs. Furthermore, it may be of value, when catheterization becomes necessary, to inject a mild germicide into the bladder after it has been emptied to control or limit the infection if damage has been done to the bladder mucosa by the overdistention.

It is needless to remark in closing that the foregoing statements are in no way intended to suggest that any less care be taken in the technic of urethral catherization.

IMMEDIATE SELF-DISINFECTION AFTER SEX EXPOSURE AS A PUBLIC HEALTH ACTIVITY*

By JETHRA HANCOCK, M.D.,**
Louisville, Ky.

This phase of public health, immediate self-disinfection after sex exposure as a public health activity, to me is no longer a theory but a deep conviction. I have followed the subject for the past ten years with more than usual interest, and have tried to study it from every viewpoint and angle. I have had sufficient opportunity during this period to make many observations.

Immediate self-disinfection after sex exposure is not a new subject. More than one hundred and fifty years ago, the great John Hunter expressed an opinion that mercuric chlorid in suitable strengths as a topical application after sex exposure would prevent venereal diseases. However, owing to superstition, this knowledge

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**Director Bureau of Venereal Diseases, State Board of Health of Kentucky, Louisville, Ky.

was not disseminated to any considerable extent until after the experimentation of Metchnikoff in 1905. After investigation and experimentation he announced that unquestionably mild bichloride of mercury applied immediately after sex exposure would prevent syphilis. Yet, even after the public announcement of the efficiency of self-disinfection, and after such an undoubted authority as Metchnikoff approved it, the so-called moralists and religious sects of England refused to recommend the practice of self-disinfection to their Army and Navy, or to the agencies for the control of venereal diseases in the civil population. Moreover, those in authority in England had a law passed forbidding the pharmacist or chemist to recommend any self-disinfecting agents.

Stimulated by the injustice of this unscientific attitude on the part of those in authority in the British Empire, an earnest body of scientists organized "The Society for the Prevention of Venereal Diseases of the British Empire." It is of extreme interest to follow the earnest work accomplished by that Society, and the antagonism they encountered. Shrewd politicians at once seized the opportunity to capitalize the prejudice of the prudes for political purposes, and caused financial support to be given to "The National Council for Combating Venereal Diseases," and refused financial aid to the "Society for the Control of Venereal Diseases."

These two societies were pitted against each other year after year. One maintained with unquestioned scientific authority, and with the solid support of all of the scientific bodies, that immediate self-disinfection was the only scientific approach for the prevention of these maladies, while the other maintained that such teaching was immoral, tantamount to the sanction of illicit sexual relations, and would spread venereal diseases rather than control them.

I need not follow further the controversy in the British Empire, but suffice to say that much good resulted because of the publicity given it as a political issue in that country, and thus the knowledge of self-disinfection was disseminated to a tremendous degree, and is now being largely practiced throughout the Empire.

During the period of this political controversy, the British Army and Navy demonstrated beyond question that immediate self-disinfection was not only scientifically correct but was practicable, and when properly instituted did diminish venereal diseases almost to an irreducible minimum.

I am sure those of you who served in the World War are familiar with the results of immediate self-disinfection in our Army and Navy. We all saw the ravages of venereal diseases among our troops, and were able to see the rapid diminution of these affections, where immediate self-disinfection was properly applied. On the other hand, we saw in our Navy during a part of this time when such a procedure was officially forbidden the incidence of venereal diseases accentuated to an appalling degree, while they diminished in the Army where the procedure was faithfully applied.

During the War I was privileged to be in charge of an unusual epidemic of venereal diseases among the Naval and Military Forces on the Panama Canal Zone, as well as the civilian population in the City of Panama and the City of Colon in the Republic of Panama. (These two cities lie just at the entrance of our Canal, one on the Pacific Coast and the other on the Atlantic Coast.) Each city is under control of the Panamanian Government, and as you know the Canal Zone is under the control of the United States Government. The Chief Health Officer of the Panama Canal Zone was then Colonel A. T. McCormack, of Kentucky, who had just succeeded our lamented and beloved Gorgas. Under our treaty relations with the Panamanian Government, the Health Officer had absolute jurisdiction in all matters of sanitation, not only in the Canal Zone but in the Republic of Panama as well. In the Canal Zone proper, prostitution in any form, either commercial or clandestine, is practically unknown, in consequence of the fact that all women of doubtful character are at once deported. Hence the only opportunity for extensive prostitution existed in the two cities mentioned, and I am sure those of you who are familiar with Spanish character know there are just two classes of women among the Spanish, the absolutely chaste who are constantly under the chaperonage of some member of their family, who constitute the majority of the Spanish women, and second, the class known as libertines who are quite generally prostitutes. As a consequence, prostitutes automatically segregate themselves into small areas of the city of Panama and the city of Colon. Thus it may be seen that the only opportunity for extensive prostitution was in these segregated areas, which served not only the civil population of the Panamanian cities but the Army and Navy in the Canal Zone, the incoming vessels of our Army and

Navy, and commercial ships from all parts of the world.

Venereal diseases had become so appalling that ships dreaded to land in these ports. The Chief Health Officer of the Canal Zone asked me to take charge of the situation, and with his energy and support we determined to throw a military guard around the segregated area in Panama City, as well as the similar area in Colon, and compel all prostitutes and females reputed to be prostitutes to remain in these segregated districts. Coincident with this activity we opened wards in the hospitals at Panama City and Colon for the care, diagnosis and treatment of all persons found to be infected with venereal diseases. All persons seeking to enter these districts of prostitution, either of the Army, Navy, commercial ships or civil population, both of the Canal Zone and the Republic of Panama, were compelled to undergo careful inspection by men assigned to this duty from the Medical Corps before being admitted. If those seeking to enter were found to be infected with venereal diseases, they were returned under guard to the ship from which they came, or were admitted to one of these hospitals for treatment. If upon inspection they were found not to be infected, they were permitted to enter these districts, but were compelled to return to the station for careful cleansing and disinfection.

You can readily see we were dealing with a condition that would be impossible in the United States. Yet we did have the advantage of demonstrating beyond question the efficiency of immediate self-disinfection for the prevention of venereal diseases, as we saw the incidence of these diseases rapidly diminish, not only in the Army but in the civil population as well. This, in my mind, is the greatest and most convincing proof that the proper disinfectant agents applied will prevent the development of venereal diseases.

I hope I have said nothing that will lead you to believe I advocate segregated prostitution. I am unalterably opposed to it, and mentioned the incident only to substantiate the fact that immediate self-disinfection by chemical measures is effective when properly applied.

This brings us to a more detailed discussion of immediate self-disinfection after sex exposure as a public health activity. Is it right? Is it practicable as a public health teaching? And if right and practicable, to what classes of people should it be taught? We believe it is right, because it is a scientific truth, and the teaching of the truth cannot be wrong. We further believe that all scientific facts should be taught to all who are of proper mental age to comprehend the truth.

It has not been long since all scientific truths were thought good for the priest to know but unwise for the populace, since all public health procedures were thought to be immoral, because disease, plague and death were the result of divine wrath and punishment for sins committed in the body. We are also sensible of the fact that, even in this enlightened day of scientific knowledge, we cannot say we will hear the testimony and reach a conclusion in accordance with the facts. Whether we realize it or not, we are influenced by customs and environments. Our opinions and judgments are apt to be *a priori*, and not the scientific expression of truth as presented to us by research and investigation. Appreciating these facts as we do, we try to be tolerant toward the opinions of others, as we would have them be of our opinions, that we may discuss these scientific questions without rancor or pride of opinion, but with an eye singled to the public good of our civilization and the rising generations.

It would seem entirely unnecessary to call the attention of this scientific body of men and women to the fact that venereal disease is taking an extensive toll of cross-section of our manhood and womanhood that it is filling our insane asylums, overflowing our feeble-minded institutes and sterilizing women. Surely it cannot be said to be morally wrong to make use of any scientific means that would in any degree ameliorate these conditions. To those who entertain the opinion that teaching immediate self-disinfection by chemical means might encourage sex promiscuity, I would say that in our opinion there is no tangible evidence that this is true. On the contrary, if there were a grain of truth in that belief, which we do not admit, we ask them to weigh this against the damage that is now being done to society by these diseases, or to put the question more concretely: is there anyone of you having a son eighteen or twenty years of age who, if you knew he had been exposed to syphilis, would not use every possible disinfectant before the infecting organisms had an opportunity to invade the fluids and tissues of his body? If this would be good for your son, why would it not be good for the sons and daughters of all men?

Moreover, it has been my experience in pri-

vate work for a number of years, in the treatment of these maladies, that once people are infected with venereal diseases their entire psychology turns to sex promiscuity rather than reformation. While on the other hand, those who have strayed from the path of rectitude and have escaped these diseases by the application of preventive means have a tendency to look upon further exposure with fear and disgust. Then, if it is right to teach immediate self-disinfection after sex exposure, how may it be done? Surely not in the home, where I believe sex is best taught by example and not by precept, and surely not by the urchin on the street, but rather in the high schools in the early classes of biology suitable to the age of the pupils and, finally, the teaching of self-disinfection to all classes of men and women on request, by pamphlets, public lectures, and all other means of disseminating scientific public health information.

We know someone will say, if we teach immediate self-disinfection to the male, why not the female as well? I am sure it is unnecessary for me to mention before this body that, owing to the anatomical formation of the parts, it is far more difficult successfully to disinfect the female than the male. I do not concede, however, that it is impracticable in females. It may be made an entirely practicable procedure, but not to the same degree as in the male. Moreover, if we break the chain at its weakest point by preventing the disease in the male sex, we shall eventually prevent it in the opposite sex. Armed with this knowledge, the chief infecting organisms, the Spirocheta pallida and gonococci are exceedingly frail and will not live in an alien environment. Therefore, the male organs of generation present less formidable difficulties in the successful application of immediate self-disinfection.

There are many antiseptics which, if immediately and adequately applied, will sterilize the male genitalia after exposure. But in the female we have a more formidable problem. When we consider that the most common cause of sterility in the female is gonorrheal infection, we must admit that scientific research should lend itself to solving this problem.

There has never been any sustained and consistent effort by any regularly organized public health authority in the United States to teach immediate self-disinfection after sex exposure. There have been a number of desultory efforts by health officials in a few states of the Union who rather sanctioned this teaching by advocating it, but have not made it a regular part of their venereal disease control program.

In the so-called early treatment propaganda issued by venereal disease clinics throughout the United States persons exposed to infection are advised to report to the clinic for sterilization. This cannot be looked upon with any degree of favor by those familiar with this subject, first, because it invites delay which defeats the object sought; and second, few people will go to such a place and thus expose their wrong-doing to clinic attendants. Therefore, we can dismiss that phase of the subject as erroneous in its conception.

The only possible way to make immediate self-sterilization effective is to have the remedial agent in convenient form so that it may be carried on the person ready for immediate application when contemplating exposure, or at least in an available place where it may be had within an hour or so. Research work has shown that to make this procedure effective, minutes, and certainly the fewest number of hours, not more than two or three, must elapse before applying the disinfectant if it is to accomplish its purpose. We can, therefore, see that knowledge of the disinfectant and its application must always be in the mind of the individual so that self-application may be intelligent.

If immediate self-disinfection is to be successful, there must be a standard remedial agent for the purpose. I think everyone will agree that there should be some appropriate authority equipped to do research work and legally constituted to pass on such agents before they receive the official endorsement of any public health officials. If agents sold for preventive purposes do not prevent, we not only lead the individual into a feeling of false security but defeat the purpose of immediate self-disinfection.

The foregoing questions have been carefully studied by the State Board of Health of Kentucky for more than a year, since we definitely decided upon this teaching as one of our activities for the control of venereal diseases. The State Health Officer and I have for a number of years believed there could be no well balanced program for the control of venereal diseases which did not include the teaching of immediate self-disinfection. At first the Federal Government furnished 50 per cent of the funds for the Bureau, but did not include this in its program. Moreover, there had been much agitation, and owing to the newness of the work and the inherent difficulties of bringing the subject

before the public it was considered wise to defer this teaching. While the program in Kentucky had been to a considerable degree effective, we have always realized we were carrying an insurmountable handicap so long as we undertook to control venereal diseases by treatment and moral propaganda without making any effort toward prevention.

In a careful analysis of venereal disease control activities, it would seem strange that public health authorities should have approached the subject in a manner different from the way we have approached other contagious diseases. We have never undertaken to control any other disease by treating infected persons and disregarding prevention. On the contrary, our first successful efforts have been directed toward preventive rather than clinical measures, and I can see no reason why the control of venereal diseases should be approached differently from that of other contagious and infectious diseases. Since we included the teaching of immediate self-disinfection as a public health measure in our program for the control of venereal diseases in Kentucky, we have wondered why we so long delayed this activity. None of the difficulties we anticipated has developed.

The fear of opposition from the moralist has been unfounded. On the contrary, we have received the hearty approval of all with whom we have come in contact in our work. We have discussed this subject with many of the leaders of public opinion throughout the State, including clergymen and Y. M. C. A. workers, who have not only agreed that this is a necessary activity, but have given us their unqualified approval. Clinicians throughout the State of Kentucky have been most enthusiastic in their support. They have accomplished much good by their teaching among the factories and other industrial organizations, and report that they have met with the same hearty endorsement that has been accorded me. There has not occurred a single incident in which we have met with criticism or opposition.

In the beginning we asked the Retail Druggist Association of Kentucky to lend us their assistance, and they responded in the most hearty and intelligent way. They have distributed much literature and are now recommending disinfecting agents endorsed by the State Board of Health of Kentucky. I believe close cooperation with the retail druggist is one of our greatest means of promoting the principle of self-disinfection.

It is not our purpose to minimize the many activities that have already been organized in the effort to control venereal diseases. They are all necessary and some of them are effective in their place. Let us have our public clinics, follow-up workers and investigators, law enforcements, and other measures, but let us not neglect one of the most important means within our grasp, self-disinfection.

DISCUSSION (Abstract)

Dr. Thomas Parran, Jr., Washington, D. C.—The experiments being carried out in Kentucky, like the more or less similar experiments which were carried out in Pennsylvania, in Buffalo, and a number of other places, are being watched with interest. In the other instances where this sort of campaign was started, it died out after a year or so, and no tangible results have been discernible. It is too early as yet to judge results of this work in Kentucky.

We should view the subject of venereal disease prophylaxis from the same standpoint as other campaigns of disease prevention. The first duty of the health officer is to prevent exposure to an infection. If an exposure has occurred, the next step is to prevent the development of the disease if possible. The person exposed to smallpox, for example, if he can be vaccinated in a few days, probably will not take the disease; a child exposed to diphtheria, if given a prophylactic treatment of antitoxin, would probably be safe. As applied to the venereal diseases, the same approach would be in order. In the case of these diseases, however, there are some practical questions of prophylaxis which have not yet been answered as applied to the civil population: (a) Can a person who has exposed himself be induced to utilize this method of treatment? (b) If it is used, will it be effective in the prevention of disease? (c) Will it increase the number of exposures to infection?

It is known that in armies a considerable percentage of venereal disease cases can be prevented by the application of chemical prophylaxis. It has been stated that that four out of every five venereal disease infections are prevented by this measure under military conditions. It is obvious, however, that it cannot prove as effective in civil life as in armies and navies because of the difficulty of educating persons to use treatment and because of the uncertainty that it will be properly used. Even if chemical prophylaxis can be shown in Kentucky or elsewhere to reduce the prevalence of venereal diseases, it can only be considered as a partial means of prevention, and its use should furnish no excuse for promiscuity.

I think the author should have mentioned that not only are large groups of "moralists" opposed to this method of prevention but there are some thoughtful scientific men who take the position that the evil results of a campaign of prophylaxis in promoting promiscuous sexual intercourse will more than counterbalance the good of prevention.

In the absence of facts, however, we should keep an open mind and form conclusions based upon the results which are finally demonstrated as to the efficacy of this method of preventing disease.

Dr. O. C. Wenger, Hot Springs, Ark.—I have no argument with a man who believes sincerely that edu-

cation or legal measures will do good or will prevent venereal diseases, but I do believe there is some value in self-disinfection.

No man can say venereal disease is on the increase or decrease. We do not know where we stand. Certainly, if self-disinfection is going to help, let us not condemn it until we have tried it. It has never been given a fair trial among the civilian population. I do not believe any chemical disinfection is as good as the sheath. You get better results by the use of the sheath, because you prevent actual contact.

I shall encourage prophylactic measures among my patients.

Dr. Walter Brunet, New York, N. Y.—Pennsylvania tried experiments in prophylaxis more than four years ago. The State Department of Health approached the manufacturing druggists and requested that they submit to the State Laboratories such products as they put out for prophylactic purposes. These specimens were examined in the laboratory, and if they were found by careful experiments to be effective, the department approved them. Prophylactic packets were stocked by all of the druggists and the clinics. The results were certainly disappointing, but Dr. Gans has never, to my knowledge, published any facts or figures as to the outcome of his prophylactic campaign. I have talked with him a number of times, but he has never given me any information on the subject. No one knows how many packets are sold in the United States in a year.

I took it upon myself personally to write to the well known manufacturing chemists. I found that about five million packets are manufactured in the United States in a year. No one knows how many of these are sold. One can go into a drug store in any large city and get a prophylactic packet, but the druggist will probably have to go to the cellar to get it. It is questionable whether the civilian population buys them.

The medical profession can be divided into four groups. One group sees the solution of the entire venereal disease problem in the development and carrying out of a plan of informing the public of the dangers of spirochetal and gonococcal infections and of the methods of prophylaxis. (I feel that Dr. McCormack and Dr. Hancock may be placed in this group.) Another group recognizes the value of prophylaxis and believes that it is a scientifically sound procedure if it is applied promptly and under such rigidly controlled conditions as are offered by the Army and Navy, but it is unable to see that there have been no valuable results from its use by state or city health officials in their venereal disease control activities. It is also mindful of the danger which might possibly arise from self-diagnosis and treatment. (I may be classified as belonging to this group.) There is a third group comprised of those who see in the advocacy of prophylaxis an invitation to licentiousness. This group expresses itself as believing that there will be an increase in exposure to infection and concomitantly a higher venereal disease rate where prophylaxis is used, because of the false sense of security engendered. In the fourth group will be found a number of physicians who have given no thought to the control and prevention of the venereal infections and who are wholly indifferent to the problem. I have brought along with me a digest of an article which appeared in the German Medical Weekly in its issue of June 25, 1926.

This article is by Prof. W. Kolle and Dr. Elsa Evers, and is entitled "The Spread or Penetration of Spirochete Pallida from the Place of Infection to the Lymphatic Glands."

It is pointed out that for a long time the opinion prevailed that the syphilitic virus appeared only in the place of infection and that it worked its way slowly into the lymphatic glands and from there the general infection began. The question of how long it takes for the spirochetes under natural circumstances to penetrate into the lymphatic glands from the place of infection in the skin or foreskin has been of general importance, especially with the use of prophylactics for the destruction of the germs after exposure to infection. It has already been demonstrated by researches made by Worms that the local application of ointments applied a few hours after contacts were not always reliable.

To establish the period when the spirochetes appear in the lymphatic glands after the infection, experiments were made with rabbits and guinea pigs. The result in the cases of rabbits was that thirty minutes after the inoculation there were so many spirochetes in the inguinal glands that these were used for new inoculation material on fresh rabbits. The distance between the primary place of inoculation and the glands was about 6 cm. More surprising results were shown in the experiments made with guinea pigs in which the distance from the site of inoculation to the lymphatic gland was about 4 cm. The importance of these experiments reported is that they point out the following conclusions:

Attempts to kill spirochetes by local application only proved that it is hopeless to try and reach the organisms that have already penetrated the tissues, even though it be only a few minutes after the exposure.

The writers state that even five minutes after intercourse the acute infection of syphilis has begun and the spirochetes from the point of entrance have advanced six inches in the lymph stream and that a local application of a germ destroying remedy cannot reach the spirochetes which have entered the tissues. It seems rather more justifiable to destroy the spirochetes already in the lymphatic glands and in the tissues by an intravenous administration of a large dose of arsphenamin. Local disinfection measures can only destroy the spirochetes which are on the surface and which have not as yet entered the tissues. Therefore, application of a prophylactic ointment may be a positive danger in the attempt to prevent a syphilitic infection.

Dr. W. A. Brumfield, Blacksburg, Va.—There is no substitute for continence. Prophylactics, unless applied early and thoroughly, are probably useless. Most persons cannot be taught to use them with sufficient care, and alcoholism is so often a factor in exposure to infection that prophylactics would usually not be used at all. However, no educational campaign for the prevention of the venereal diseases is complete that does not discuss the importance of prompt and thorough use of prophylactics.

Dr. Alexander S. Garrett, Weatherford, Tex.—To encourage the use of medicine to prevent venereal diseases in the practice of illegal sexual relations, I deem it to be morally wrong and not compatible with the high calling and dignified standing of the medical profession anywhere in the civilized world. On the other hand, every physician who is entitled by law to practice his profession should and ought to be an apostle of virtue both by tongue and pen, and an advocate of the practice of virtue in its perfection alike by both

sexes from birth till death. Let us, as physicians, seek to make the world better, not worse.

Dr. S. W. Welch, Montgomery, Ala.—I cannot let this discussion go by without challenging the temptation which is given to the youth of this country, both male and female, to encourage promiscuous indulgence. We older men owe it to our boys and our girls to hold up a higher standard than that which some of us practiced.

I do not believe that we have gained a great deal by the educational program that we have put over in recent years. But the type of education that has been put over, holding up the responsibility of parenthood of the next generation, is worth while. When a father has explained to a boy, or a mother to a girl, that it is a question of keeping his blood stream clean that he can send it on down through his boy, and his boy, perfectly clean through the ages to come, it has an appeal such as no other thing will have. It may be all right to advocate prophylaxis, but I do not believe it is as effective. I believe the boy of today is nothing like so bad as he was in my day, and an appeal to his sense of responsibility will go further than anything else.

The question of prevention is in the carrier. It is not in the prevention of the exposure. We should have a law that will apprehend carriers, and treat them until they are well.

Dr. Hancock (closing).—We would not have you think that we believe this procedure a panacea for the control of venereal diseases. We regard it as a step in the right direction.

Like Dr. Welch, I, too, have a son and I want him to carry the same strain of clean blood to his children that I gave him. He shall be taught the dignity and strength of chastity, and above all things he shall be encouraged to lead the same clean life that he would expect his wife to lead. Yet, at the same time I shall feel myself derelict of my duty towards him if I fail to teach him the scientific methods to prevent venereal disease if he should stray from the paths of virtue, knowing, as I do, that the application of this knowledge may save him from bringing disease and misery on some sweet girl that he may take for his wife.

We wanted your viewpoint, and we believe we have your sympathy as scientific men. We know that you above all know the conditions as they exist. It is admitted by all that there is a great deal of exposure, and it will probably continue, no matter what we do. Let us not take a one-sided viewpoint of this subject, but rather let us meet the facts as they present themselves; let us carry the truth to the people in its nakedness, and we will find that they will trust and respect us for it; let us urge virtue and chastity, yet at the same time let us teach scientific prophylactic measures. All men of experience know there will be many exposures and infections of innocent people, no matter what our moral teaching may be. If people will not be virtuous, let them be clean.

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DR. M. Y. DABNEY, Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Twenty-First Annual Meeting
Memphis, Tennessee, November 14-17, 1927

ANOTHER TREATMENT OF ARTHRITIS

Ortho-iodoxy benzoic acid is a substance which has been known since 1892 and has been fairly extensively studied. It may be injected intravenously into men or animals in moderate doses without great danger, and may also be given by mouth. In large doses in animals it causes apnea and other symptoms, and when administered to human beings in small quantities of 1 or 2 per cent solution, is followed by a reaction, of varying severity.

It is germicidal *in vitro* and *in vivo*. When given intravenously it has a non-specific stimulating effect upon the production of antibodies against bacteria, and upon the production of hemolysins and agglutinins in rabbits which have been immunized to red blood cells. Injection is followed by a mild polymorphonuclear leucocytosis. When the drug is mixed with human serum *in vitro*, it markedly stimulates the phagocytosis of streptococci and staphylococci by leucocytes. It is an organic peroxid which apparently stimulates oxidation *in vivo*.[1]

Upon the idea that arthritis is due to a low grade infection which might be benefited by it, Young and Youmans[2] tried this compound over a three-year period in forty-three patients with arthritis. More than half of these rather promptly showed marked improvement, and only three failed to improve. The cases selected had been treated unsuccessfully by other methods, and during ortho-iodoxy therapy were for the most part given no other treatment.

Millard Smith[3] later used the same drug in thirty-three cases of arthritis, and reports again marked relief in some of them. Twelve acute joint cases were promptly relieved, but only two showed no recurrences. Relief was obtained in some chronic cases; and chronicity or degree of deformity, he concludes, is no contra-indication. Injection is followed by three immediate effects, he says: analgesia, relief of muscle spasm, and reduction of swelling. The effect is too immediate to be due to antibody stimulation. Young and Youmans had found the reaction not troublesome, and concluded that its severity was a function rather of the speed of injection than of the quantity used. A rabbit could be killed by a rapid injection of a small quantity, but was not harmed by a much larger dose very slowly administered. Smith, however, finds the reaction usually severe.

He reports one case which had secured prompt relief from an acute attack of arthritis by injection of ortho-iodoxy benzoic acid, but later had a recurrence. While preparations were being made for another injection, it was decided to do a high colonic lavage first. Following this, with the removal of much putrid material, remission of symptoms was again immediately obtained, and further medication was unnecessary.

If one compares the cases of Young and Youmans with others reported at the same time, in which no intravenous injections were used, one notes the statement of Cecil and Archer[4] that of ninety-two patients with acute arthritis who appeared for treatment within six months after the onset of symptoms, 82 per cent either recovered completely or were greatly improved by hospitalization and removal of foci of infection. Those whose symptoms had lasted five or six years rarely received marked benefit. Young and Youmans observed cases of long standing which were markedly improved, and this is confirmed by Smith.

It is practically impossible to evaluate a new treatment in the first five years of its use. A form of therapy for arthritis arises frequently,

1. Arkin, A.: The Influence of an Oxidizing Substance (Sodium Iodoxy Benzoate) on Immune Reactions. Jour. Inf. Dis., 3:349, 1915.
2. Young, A. G., and Youmans, J. B.: Use of o-iodoxy Benzoic Acid in the Treatment of Arthritis. J. A. M. A., 87:746, Sept. 4, 1926.
3. Smith, Millard: Use and Action or o-iodoxy Benzoic Acid in the Treatment of Arthritis. Boston Med. Surg. Jour., 196:305, Feb. 24, 1927.
4. Cecil, R. L., and Archer, B. H.: Classification and Treatment of Chronic Arthritis. J. A. M. A., 87:746, Sept. 4, 1926.

and the eager turning to the new merely attests the weakness of the old method. As in every disease, many patients recover with, by and in spite of treatment. Those who are interested in the subject should read the articles upon the use of ortho-iodoxy benzoic acid, and determine whether they wish to experiment or are equipped for it.

SKIN CHEMISTRY IN ECZEMA

Eczema remains in all treatises upon affections of the skin, among the diseases of unknown etiology.[1] It is common in childhood, and many cases recover completely before adult life. Certain local preparations cause the disappearance of the lesions in many instances, and dietary factors are also usually involved. Hereditary or congenital states and skin irritability must also be factors.

Klauder and Brown[2] have studied the response of the skin of rabbits to irritants, while the animals were on controlled diets. They found skin irritability decreased when the rabbits ate greens only, and increased on most other diets. Irritability was diminished after injection of calcium chlorid and it was decreased during narcosis. It was decreased following the injection of most colloidal substances, as for example human serum. Acid injections did not affect the irritability. It was usually increased in hepatitis and nephritis.

The chemistry of the skin may be of more importance in eczema than is that of the blood. The opposing actions of calcium, potassium and sodium upon tissue irritability have been studied. Calcium decreases the permeability of cell membranes, while potassium and sodium increase it. Muscle contraction in solutions of different salt concentration can be shown to vary with the electrolyte present.

Klauder and Brown's work shows that if one attempts to correlate degree of skin irritability with mineral content of the skin there appears to be an inverse relation between the degree of irritability and the calcium content. The greater the calcium content the less the irritability; and the greater the potassium content the greater the irritability. This was true in the majority though not in all instances. The skin variations of magnesium and sodium were great and uncorrelated.

One digs thus a little deeper into the mine of causes of eczema, and concludes that it is perhaps related to mineral content of the outer integument. This in turn may be governed by endocrin balance. Evidence has been mentioned previously in the JOURNAL that anterior pituitary lobe extract causes discharge of potassium, calcium and phosphorus by the tissues.[3] There is probably interaction among all endocrin organs, and no doubt other secretions than the pituitary are concerned in mineral retention. Eczema may thus be due to endocrin disorder, which at least in young children is often due to improper nutrition.

HIGH FAT FEEDING

Few experiments have become so popular or actually so instructive as those of observing animals upon highly purified and calculated one-sided diets. The ability of a young animal to adapt itself and grow upon some of these is marvelous, as is the amount of accurate knowledge which biochemists have obtained of the limits beyond which dietary restriction may not go. Certain vitamins and certain minerals are necessary to growth, and it has usually been thought that minimum amounts of protein, carbohydrate and fat were also necessary.

A ketogenic, or high-fat low-carbohydrate diet, recently has been suggested for the treatment of epilepsy;[4] and it has been noted that children maintained upon these diets for a period of months appeared in excellent health. Osborne and Mendel,[5] from observations of animals upon a diet almost entirely devoid of carbohydrate, concluded that adequate growth is possible to a certain point. Although in diabetes it has long been considered that fat cannot burn without carbohydrate, young animals could be maintained in health without it. Carbohydrate for intermediary metabolism, for the metabolism of fats and development of muscular contraction could be supplied entirely from endogenous sources. Carbohydrate was not essential in the diet for growth to a certain point.

Levine and Smith[6] likewise conclude that

1. Foerster, O. H.: Abt's Pediatrics, 7:175, W. B. Saunders Co., 1926.
2. Klauder, J. V., and Brown, H.: Experimental Studies in Eczema. Arch. Derm. and Syph., 15:1, Jan., 1927.
3. See Editorial, JOURNAL, 20:169, Feb., 1927.
4. See Editorial, JOURNAL, 252, March, 1927.
5. Osborne, T. B., and Mendel, L. B.: Growth in Diets Poor in True Fats. Jour. Biol. Chem., 45: 145, 1920.
   Ibid., Nutrition and Growth on Diets Highly Deficient or Entirely Lacking in Pre-formed Carbohydrate. Jour. Biol. Chem., 59:13, 1924.
6. Levine, H., and Smith, A. P.: Growth Experiments upon Diets Rich in Fat. Jour. Biol. Chem., 72:223, March, 1927.

carbohydrate for growth may be supplied by the endogenous metabolism on a diet containing 86 per cent fat without carbohydrate. The animals upon a high carbohydrate diet required more calories for growth than did the animals on a high fat diet. Practically all the ingested fat was used, and the livers of the animals appeared to be normal.

One could not conclude from this that a high fat diet is advisable, because laboratory animals apparently never attain full growth on these one-sided diets. But perhaps the value of carbohydrate has been exaggerated, and perhaps it would be beneficial to the young child to obtain more of his calories from fat. Carbohydrates are usually the cheapest diet which satisfies immediate hunger; and as cooked starches are generally considered easily digestible they are given freely to children. This is a feeding custom depending upon demand and supply; and many of our feeding customs have been shown to be objectionable. It is possible that the custom of adding carbohydrate to an infant's low-fat diet to increase the number of calories may be erroneous.

Book Reviews

Modern Medicine, Its Theory and Practice in Original Contributions by American and Foreign Authors. Edited by Sir William Osler, Bart., M.D., F.R.S., Late Regius Professor in Oxford University, England; Honorary Professor of Medicine in the Johns Hopkins University, Baltimore; Formerly Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia, and of the Institutes of Medicine in McGill University, Montreal, Canada. Third Edition, Thoroughly Revised. Re-edited by Thomas McCrae, M.D., Professor of Medicine in the Jefferson Medical College, Philadelphia; Fellow of the Royal College of Physicians, London; Formerly Associate Professor of Medicine, the Johns Hopkins University; Assisted by Elmer H. Funk, M.D., Assistant Professor of Medicine, Jefferson Medical College, Philadelphia. Illustrated. Philadelphia: Lea & Febiger. Cloth, $9.00.

The appearance of each volume of this revised third edition is eagerly awaited by the medical profession. Not in many a day has any system been more supreme in its field than Osler's "Modern Medicine." Hence a revision of this classic is always an important event in medicine.

Volume III: *Diseases of Metabolism and Diseases of the Digestive System* has eighteen contributors. These include such well known names as Eugene F. DuBois, Director of the Russell Sage Institute of Pathology, who devotes nearly a hundred pages to a full discussion of "Metabolism From the Point of View of the Practitioner;" Thomas B. Futcher, who takes up "Diabetes, Mellitus and Insipidus" and "Gout;" James M. Anders, who treats of "Obesity;" Chevalier Jackson, on "Diseases of the Oesophagus;" Julius Friedenwald on "Functional Diseases of the Stomach;" Eugene L. Opie on "Diseases of the Pancreas," etc., on through the list of equally good contributions. The volume is complete and well balanced.

Volume IV: *Diseases of the Respiratory System; Diseases of the Circulatory System.* Besides sections by the late Sir William Osler himself, there are good monographs by Sir Thomas Lewis, James B. Herrick, Charles F. Hoover, George Blumer, Alfred S. Worthin, Henry A. Christian, H. A. Hare, Alexander McPhedran, George W. Norris, and various other outstanding men in the profession. This is one of the very best of the four volumes that have appeared to date.

It is highly gratifying to those who have used the earlier editions of Osler's System as a sort of Bible, to see this successor so ably revised and edited. It is a worthy offspring of an honorable parentage.

Politzer's Textbook of the Diseases of the Ear. For Students and Practitioners. By Milton J. Ballin, M.D., Ph.B., Attending Oto-Rhino-Laryngologist, Bronx Hospital, New York City. Sixth edition. 752 pages, with 302 illustrations. Philadelphia: Lea and Febiger, 1926. Cloth, $10.00.

In the sixth edition of this book there is a great deal that is new in the sections on the treatment and pathology of aural affections, and in particular those conditions referable to the labyrinth. The original text, however, has been largely retained, omitting only the items of less importance. Every chapter has been carefully rewritten and the additions are well selected and of value.

Hunter Tod's Diseases of the Ear. Revised and largely rewritten by George C. Cathcart, M.A., M.D., Consulting Surgeon to the Throat Hospital, Golden Square; Late member of the Special Aural Board, Ministry of Pensions. Second Edition. 333 pages, illustrated. New York: Oxford University Press. Cloth, $3.50.

Intended primarily as a practical handbook for the senior student and general practitioner, the second edition of Mr. Tod's little handbook as revised and rewritten after Mr. Tod's death, by George C. Cathcart, is a very valuable reference work for the experienced otologist as well, being of convenient size for the coat pocket or the hand bag.

The subject matter has been condensed and the number of illustrations has been increased to more than double that of the former edition. A number of radiograms has been included.

Preventive Medicine and Hygiene. By Milton J. Rosenau, Professor of Preventive Medicine and Hygienic, Harvard Medical School; Professor of Epidemiology, Harvard School of Public Health; Commander, M.C., U. S. Naval Reserve; Formerly Director of the School of Public Health of Harvard University and the Massachusetts Institute of Technology; Formerly Director of the Hygienic Laboratory, U. S. Public Health Service. Fifth Edition. 1458 pages. New York and London: D. Appleton & Co.

Since its first appearance in 1913, this book has taken its place as a standard work on preventive medicine and hygiene. The present edition has been extensively

revised and sections added on psychoanalytic approach to sex hygiene, the prevention of cancer, the conservation of vision, periodic physical examination, flukes and their relation to disease, granuloma inguinale, balantidial dysentery, resuscitation, gas masks, statistical methods and practical points in public health administration.

This book is still the best single volume on its subject and the experience and position of the author and his co-laborators are such as to make it authoritative.

It is to be regretted that there are some defects in the mechanical make-up of the book that render it illegible in places.

The Natural Processes of Healing in Pulmonary Tuberculosis. By Marc Jaquerod, M.D., Physician-in-Charge, Grand Hotel Sanatorium, Lysin, Switzerland. Translated by J. Denny Sinclair, M.B., Ch.B., with 60 x-ray illustrations and 45 diagrams. New York: William Wood & Co., 1927.

This book well illustrates the teaching of the modern French school of phthisisology. There is an excellent chapter on artificial pneumothorax, portraying the modern possibilities in the use of this method in early cases in effecting a cure of consumptives.

The radiographic pictures with each chapter are very clear illustrations of what the author has been describing. The graphical annotations on the signs of auscultation in the back of the book are excellent descriptions of the present graphical methods used in pulmonary findings.

Southern Medical News

ALABAMA

A section meeting of the American College of Surgeons was held in Birmingham January 24-25. The following officers were elected: Dr. John Helms, Tampa, Fla., Chairman; Dr. Robert B. McIver, Jacksonville, Fla., Secretary; Dr. N. M. Heggie, Jacksonville, Fla., Counselor. Tampa was chosen as the next meeting place.

The Barbour County Medical Society on February 1 held a banquet at Bluff City in honor of Dr. Wm. Preston Copeland, Eufaula, the oldest charter member.

Dr. Samuel W. Welch was unanimously reelected State Health Officer for a period of five years at a meeting of the Board of Censors of the State Medical Association held in Montgomery January 10.

The Montgomery Memorial Hospital, Montgomery, will erect a nurses' home to cost approximately $60,000.

Deaths

Dr. Albert L. Self, Mobile, aged 53, died December 27 at Taylorville, Ill., of carcinoma of the throat.

Dr. Jesse Olonzo Gray, Pell City, aged 65, died January 20 of cerebral hemorrhage.

Dr. Edward Swann, Marion, aged 57, was accidentally shot and killed January 13.

Dr. Edward Bernard Dreaper, Mobile, aged 44, died December 3 of chronic parenchymatous nephritis.

Dr. George R. Rau, Tuscaloosa, died February 18.

ARKANSAS

The meeting of the Arkansas State Medical Society will be held in Little Rock May 11-13.

The Arkansas County Medical Society has elected Dr. S. A. Drennen, President; Dr. C. A. Lumsden, Vice-President; Dr. J. E. Neighbors, Secretary-Treasurer.

Northwest Arkansas Medical meeting sponsored jointly by Washington and Benton County Medical Societies met at Rogers January 27.

The Sectional meeting of the American College of Surgeons for the States of Oklahoma, Texas and Arkansas was held in Tulsa, Okla., January 28-29. Dr. H. Fay H. Jones, Little Rock, was elected Secretary; Dr. P. W. Lutterloh, Jonesboro, Chairman; Dr. T. F. Kittrell, Texarkana, Councilor. Little Rock was chosen as the next meeting place, January, 1928.

The University of Arkansas on January 6 inaugurated a weekly radio medical extension service from station KUOA. The first radio lecture was by Dr. C. C. Bass, New Orleans, La., Dean of Tulane University of Louisiana School of Medicine. His subject was "Treatment of Malaria." Programs will be broadcast at 8 o'clock Thursday evenings.

Dr. Robert Caldwell was elected Chief of Staff of St. Vincent's Infirmary, Little Rock, to succeed Dr. Dewell Gann, Jr., who resigned after having held the position for five years. Other department heads elected were Drs. John R. Dibrell, A. C. Shipp, S. B. Hinkle, H. W. Browning, Pat Murphey, William R. Bathurst, Frank Vinsonhaler, S. C. Fulmer, E. J. Mahoney, D. A. Rhinehart, M. E. McCaskill, W. D. Rose, J. W. Carruthers, H. F. H. Jones, M. J. Kilbury and Dewell Gann, Jr.

Dr. John R. Dibrell, Little Rock, was recently appointed a member of the State Board of Health.

Dr. Fenton L. Husbands, Blytheville, was elected President of the Tri-State Medical Association at the recent meeting in Memphis, Tenn.

Pulaski County Medical Society has elected Dr. Anderson Watkins, Little Rock, President.

Dr. Joel C. Land, Walnut Ridge, and Miss Elizabeth Davis, Paragould, were married recently.

Deaths

Dr. Edward Franklin Hodges, Branch, aged 47, died February 5 in a Fort Smith hospital after being injured by an automobile while crossing the street.

Dr. Lawrence C. Gray, Clarksville, aged 42, died January 21.

Dr. William M. McRae, Blytheville, aged 49, died February 2 of pneumonia.

Dr. Ezra T. Hall, Beebe, aged 88, died December 7.

Dr. John S. McCreight, Luxora, aged 55, died at the Baptist Memorial Hospital, Memphis, Tenn., following an operation.

Dr. John Bartlett Parrish, Marvell, aged 63, died recently of acute dilatation of the heart.

Dr. Henry C. Wallace, Hot Springs National Park, aged 81, died December 17.

DISTRICT OF COLUMBIA

The American College of Surgeons held its sectional meeting for Maryland, District of Columbia, Virginia and West Virginia in Washington January 17-18.

The late Dr. Ernest P. Magruder has been awarded the cross of the Royal Order of St. Sava, posthumously. He lost his life in the typhus epidemic in Serbia following the World War.

Deaths

Dr. Robert S. Trimble, Washington, aged 61, died January 2 of heart disease.

Dr. Henry E. Kalusowski, Washington, aged 76, died January 7 of myocarditis.

FLORIDA

Duval County Medical Society has elected Dr. Louie Limbaugh, President; Dr. S. E. Driskell, Vice-President; Dr. K. A. Morris, Secretary; Dr. W. M. Shaw, Treasurer.

Alachua County Medical Society has elected Dr. S. D. Rice, Gainesville, President; Dr. W. Lassiter, Gainesville, Vice-President; Dr. J. L. Summerlin, Gainesville, Secretary-Treasurer.

Seminole County Medical Society has been organized. The following officers were elected: Dr. Samuel Puleston, Sanford, President; Dr. John W. Martin, Oviedo, Vice-President; Dr. Charles L. Park, Sanford, Secretary-Treasurer.

Pasco-Hernando-Citrus County Medical Society has elected Dr. George R. Creekmore, Brooksville, President; Dr. Geo. A. Dame, Inverness, Vice-President; Dr. T. F. Jackson, Dade City, Secretary-Treasurer.

Polk County Medical Society has elected Dr. R. H. Mooty, Winter Haven, President; Dr. J. B. Lowry, Nichols, Vice-President; Dr. Herman Watson, Lakeland, Secretary-Treasurer.

The Association of Surgeons of the Atlantic Coast

Line Railway met in St. Petersburg in January. Dr. Edwin G. Moore, Elm City, N. C., was elected President. The next meeting will be held at Virginia Beach, Va.

The annual banquet of the Duval County Medical Society was held March 2 at Jacksonville. Dr. E. Starr Judd, Rochester, Minn., was guest of honor and spoke on "The Surgery of the Biliary Passages."

Marion County Medical Society, at its December meeting, adopted a resolution requiring each member to attend at least two meetings in a year in addition to paying dues in order to keep his membership in good standing.

Marion County and the City of Ocala will share the expenses of constructing the new ninety-bed Munroe Memorial Hospital. The hospital will cost more than $100,000. There is available about $70,000 for equipment.

Sarasota Hospital is the recipient of a complete roentgen-ray department. This was given by Dr. Joseph Halton and Honore and Potter Palmer, of Sarasota and Chicago, respectively.

A ward in the Jackson Memorial Hospital, Miami, will be named the William Deering Ward, this in honor of the father of the late James Deering, Chicago, from whose estate $500,000 was recently transferred to Miami, the interest from which is to be used to maintain the Ward.

Dr. Lydia Allen DeVilbiss, Buena Vista, is the new Medical Advisor to women at the University of Miami.

Dr. R. S. Lowry has been appointed Health Officer for the City of Fort Lauderdale.

Dr. Harry Hamilton Cooke, St. Petersburg, has been appointed a Fellow in Surgery at the Mayo Clinic.

Dr. S. B. Bieker, St. Petersburg, and Dr. Annette Malone, Memphis, Tenn., were married in Memphis February 16.

Deaths

Dr. Benjamin Luke Padgett, Hastings, aged 44, died January 5 of heart disease.

Dr. W. B. McCrae, Jasper, aged 62, died January 7 of heart disease.

Dr. George W. Holmes, Sharpes, aged 82, died December 23 of cerebral hemorrhage.

Dr. Andrew Fletcher Quillian, Bradentown, aged 40, died January 4 following an operation.

Dr. Henry McMillan, Morriston, died January 25 of influenza.

Dr. Olive Estelle Worcester Swan, Lady Lake, aged 68, died in January of cerebral hemorrhage.

Dr. Charles M. Roberts, Umatilla, aged 45, died December 30 as the result of an automobile accident.

GEORGIA

The Georgia State Medical Association will hold its annual meeting in Athens, May 10-13.

Baldwin County Medical Society has elected Dr. George L. Echols, Milledgeville, President; Dr. J. W. Mobley, Milledgeville, Vice-President; Dr. H. D. Allen, Jr., Milledgeville, Secretary-Treasurer.

Cook County Medical Society has elected Dr. S. G. Ethridge, Sparks, President; Dr. H. W. Clements, Adel, Vice-President; Dr. W. M. Shepard, Adel, Secretary-Treasurer.

Fulton County Medical Society has elected Dr. Marion T. Benson, Atlanta, President; Dr. E. C. Davis, Atlanta, Vice-President; Dr. Grady E. Clay, Atlanta, Secretary-Treasurer.

Habersham County Medical Society has elected Dr. O. N. Harden, Cornelia, President; Dr. W. H. Garrison, Clarkesville, Vice-President; Dr. R. B. Lamb, Demorest, Secretary-Treasurer.

Jasper County Medical Society has elected Dr. J. A. Brown, Shady Dale, President; Dr. J. F. Anderson, Hillsboro, Vice-President; Dr. E. M. Lancaster, Shady Dale, Secretary-Treasurer.

Macon County Medical Society has elected Dr. D. B. Frederick, Marshallville, President; Dr. C. P. Savage, Montezuma, Vice-President; Dr. F. M. Muilino, Montezuma, Secretary-Treasurer.

Morgan County Medical Society has elected Dr. W. M. Fambrough, Boswick, President; Dr. J. L. Porter, Rutledge, Vice-President; Dr. Dan M. Carter, Madison, Secretary-Treasurer.

Talbot County Medical Society has elected Dr. J. E. Peeler, Woodland, President; Dr. W. L. Leonard, Talbotton, Vice-President; Dr. C. C. Carson, Talbotton, Secretary-Treasurer.

Taliaferro County Medical Society has elected Dr. A. T. Ray, Sharon, President; Dr. T. C. Nash, Philomath, Vice-President; Dr. John A. Rhodes, Crawfordville, Secretary-Treasurer.

Telfair County Medical Society has elected Dr. Frank Mann, McRae, President; Dr. W. H. Powell, Lumber City, Vice-President; Dr. C. J. Maloy, Helena, Secretary-Treasurer.

Tift County Medical Society has elected Dr. W. E. Tyson, Chula, President; Dr. D. B. Harrell, Tifton, Vice-President; Dr. C. S. Pittman, Tifton, Secretary-Treasurer.

Tri-County Medical Society (Calhoun, Early, Miller) has elected Dr. J. G. Standifer, Blakely, President; Dr. W. C. Hays, Colquitt, Vice-President; Dr. C. R. Barksdale, Blakely, Secretary-Treasurer.

Walker County Medical Society has elected Dr. M. W. Spearman, Chickamauga, President; Dr. J. A. Shields, LaFayette, Vice-President; Dr. J. H. Hammond, LaFayette, Secretary-Treasurer.

Ware County Medical Society has elected Dr. J. E. Penland, Waycross, President; Dr. C. M. Stephens, Waycross, Vice-President; Dr. Kenneth McCullough, Waycross, Secretary-Treasurer.

Warren County Medical Society has elected Dr. A. W. Davis, Warrenton, President; Dr. F. L. Ware, Warrenton, Vice-President; Dr. R. C. McGehee, Warrenton, Secretary-Treasurer.

Washington County Medical Society has elected Dr. N. Overby, Sandersville, President; Dr. J. B. Dillard, Davisboro, Vice-President; Dr. B. L. Helton, Sandersville, Secretary-Treasurer.

The Executive Board of the Surgical Association of the A. & W. P. Western Railroad of Alabama, Georgia, and Elberton and Eastern Railroads, is as follows: Drs. J. R. Garner, Willis Jones and Hugh M. Lokey.

Under the auspices of the Randolph County Medical Society, an all-day clinic was held at the Patterson Hospital February 3 by Drs. W. A. Mulherin, W. J. Cranston and Henry Michael, of the University of Georgia Medical School.

Jacob Elsas has offered to contribute $100,000 for a part-pay ward for Grady Hospital, Atlanta, on condition that the City and County officials bring the total up to $400,000.

The Frances-Berrien Hospital, Rome, was recently taken over by Dr. John T. McCall, and will be called the McCall Hospital.

Hopewell, the new tuberculosis hospital at Smithsonia, has been opened. The hospital will provide quarters for eighteen white and twelve negro patients.

Dr. Henry L. Akridge has been reelected Health Commissioner of Glynn County.

Dr. Frank E. Artaud and Miss Viola Barili, both of Atlanta, were married December 6.

Deaths

Dr. Benjamin S. Purse, Savannah, aged 84, died January 19 of myocarditis.

Dr. John McGregor Spence, Camilla, aged 56, died January 25 of tuberculosis.

Dr. Charles Lincoln Ketcham, Leesburg, aged 59, died January 29 at Laurel, Ohio, of pernicious anemia.

Dr. Joseph Micajah Thomas, Griffin, aged 60, died December 23 of cerebral hemorrhage.

Dr. Faris C. Richards, Jasper, aged 66, died December 23.

Dr. Henry Paden Lyon, Atlanta, aged 46, died January 29 at the Davis-Fischer Sanatorium of peritonitis following appendicitis.

Dr. William R. McCrary, Decatur, aged 65, died in January at the home of his daughter in Atlanta of heart disease.

KENTUCKY

Bourbon County Medical Society has elected Dr. M. J. Stern, President; Drs. H. M. Boxley and H. B. Anderson, Vice-Presidents; Dr. C. G. Daugherty, Secretary-Treasurer.

Carter County Medical Society met in December and resolved that they continue the annual meeting at Carter Caves some time in August.

Dr. George W. Armes, Leitchfield, was recently elected Health Officer of Grayson County.

Dr. Robert Julian Estill, Lexington, has been appointed a member of the local Board of Health, and Dr. Lee C. Redmon reappointed a member of the Board for a period of three years.

Dr. Herman Mahaffey recently joined the staff of the City Health Officer of Louisville.

The Baptist General Hospital, Ashland, is launching a drive for $300,000 to enlarge the hospital and purchase additional equipment.

Deaths

Dr. Joseph Lacy Hopson, Cadiz, aged 42, died December 30 at a hospital in Nashville, of heart disease.

Dr. John Dudley Neet, Versailles, aged 74, died January 24 following a long illness.

Dr. Adolphus C. Wintermeyer, Covington, aged 58, died January 7 at the Good Samaritan Hospital, Cincinnati, of angina pectoris.

Dr. Jesse Franklin Wilder, Corbin, aged 61, died December 4.

Dr. Charles W. McCollum, Erlanger, aged 65, died November 24.

Dr. Henry H. Koehler, Louisville, aged 57, died January 13 at the Beechhurst Sanitarium of cerebral hemorrhage.

Dr. Uberto W. McPherson, Louisville, aged 53, died December 11 of cerebral hemorrhage.

Dr. Anderson N. Ellis, Maysville, aged 86, died January 25 at the Cambridge (Mass.) Hospital of cerebral hemorrhage.

Dr. James Oliver Jenkins, Newport, aged 75, died January 23 of nephritis.

Dr. Charles Bruce Smith, Millersburg, aged 62, died December 28 of heart disease and chronic nephritis.

Dr. Robert Lee Lattimore, Blanche, aged 59, was shot and killed December 25.

Dr. Wm. L. Mosby, Bardwell, died in January.

LOUISIANA

LaFayette Parish Medical Society has elected Dr. E. E. Guilbeau, Carencro, President; Dr. C. E. Hamilton, Lafayette, Vice-President; Dr. Harold G. F. Edwards, Lafayette, reelected Secretary-Treasurer.

Lafourche Valley Medical Society has elected Dr. D. T. Martin, Donaldsonville, President; Dr. Chas. J. Barker, Thibodaux, Vice-President; Dr. Chas. S. Roger, Napoleonville, Secretary-Treasurer.

LaSalle Parish Medical Society has elected Dr. Thomas M. Butler, Trout, President; Dr. J. P. Durham, Trout, Vice-President; Dr. W. V. Taylor, Olla, reelected Secretary-Treasurer.

St. Mary Parish Medical Society has elected Dr. L. B. Crawford, Patterson, President; Dr. C. M. Horton, Franklin, Vice-President; Dr. A. C. Kappel, Franklin, Secretary-Treasurer.

Terrebonne Parish Medical Society has elected Dr. R. W. Collins, Houma, President; Dr. I. I. St. Martin, Houma, Vice-President; Dr. P. E. Parker, Houma, Secretary-Treasurer.

At the recent exercises in the Tulane University of Louisiana School of Medicine, the C. Edmund Kells Memorial Library and Museum was dedicated to C. Edmund Kells, Jr., D.D.S. Dr. Kells, now seventy years old, is said to be the first dentist to use the roentgen ray in dental diagnosis and as a result of his studies he has had to undergo many operations on his left arm, which was finally amputated.

The John Dibert Memorial Tuberculosis Hospital, New Orleans, was recently opened.

Work is to start soon on a new twelve-story building for Tulane University of Louisiana School of Medicine.

The New Orleans Home for Incurables will open a new fifty-bed addition on Henry Clay Avenue, known as the Elsie Dielman Behring Memorial Wing, to be used for epileptics.

Dr. Louis Levy has been named president of the staff of Hotel Dieu.

Dr. Edward William Alton Ochsner, Assistant Professor of Surgery, University of Wisconsin Medical School, Madison, has been appointed Professor of Surgery at Tulane University of Louisiana School of Medicine, New Orleans, succeeding Dr. Rudolph Matas, who is retiring from active teaching.

Dr. Isadore B. Rougon was recently elected President of the Shreveport Medical Society.

Dr. Robert G. Hawkins, Palmetto, was recently elected President of the St. Landry Parish Medical Society.

Dr. Robert L. Credille, Bastrop, has been elected President of the Morehouse Parish Medical Society recently organized.

Dr. Louis Abramson, Shreveport, is the new President of the Cotton Belt Railway Surgeons' Association.

Deaths

Dr. John Luther Wilson, Alexandria, aged 57, died November 28 of dilatation of the heart.

Dr. Henry Buck, Evergreen, aged 48, died suddenly January 5.

Dr. Augustus F. Gates, Hammond, aged 54, died February 3 as the result of cerebral hemorrhage.

Dr. Otis A. Biggs, Grayson, aged 52, died January 23 of cerebral hemorrhage.

Dr. John Davidson Gladney, Homer, aged 34, died December 22 of chronic nephritis.

Dr. Henry C. Baucum, Haynesville, aged 49, died December 17 of angina pectoris.

Dr. Hines C. Webb, Crowley, aged 60, died November 21 of carcinoma of the gall bladder and liver.

MARYLAND

New quarters for the Gynecologic Department of Johns Hopkins Hospital, Baltimore, provided at a cost of $150,000, were formally opened January 24. There are five distinct units in which operations can be done simultaneously in the presence of students.

The South Baltimore General Hospital is conducting a campaign for $212,000. More than $50,000 was subscribed at the dinner opening the campaign.

An eight-story Medical Arts Building is being erected at the corner of Cathedral and Richmond Streets, Baltimore. The building will be ready for occupancy September 1, and will be used exclusively for physicians and dentists. Applicants for space must be members in good standing of their local societies.

Friends of the late Dr. Charles G. Hill will present a portrait of Dr. Hill to the Medical and Chirurgical Faculty. Dr. Hill was President of the Faculty in 1895-1896 and was for many years Physician-in-Chief at Mount Hope Retreat, Arlington.

Dr. John R. Benton succeeds Dr. Norman S. Dudley, Church Hill, as Health Officer of Queen Anne's County.

(Continued on page 34)

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(Continued from page 334)

Dr. Joseph P. Franklin, Chestertown, succeeds Dr. John F. Hogan as Director of the Bureau of Communicable Diseases. Dr. Hogan resigned.

Dr. John M. T. Finney, Professor of Surgery, Johns Hopkins University Medical School, Baltimore, who gave the annual Hunterian lecture in London, has been made an honorary fellow of the Hunterian Association and also of the Medical Society of London.

Dr. John H. Snoke, Assistant Director, Johns Hopkins Hospital, has resigned to become Superintendent of the Bryn Mawr Hospital, Bryn Mawr, Pa. Dr. Frank M. Houck, formerly Superintendent of the Cragmor Sanatorium, Colorado Springs, Colo., will succeed him.

Dr. Henry W. McComas, Oakland, has been elected President of the Allegany-Garrett County Medical Society.

Deaths

Dr. John T. Spicknall, Baltimore, aged 78, died December 29.

Dr. Rollin B. Page, Easton, aged 49, died November 25 at a local hospital.

Dr. Mabel Belt, Baltimore, aged 38, died January 11 of heart disease.

Dr. Thomas B. Hall, Halethorpe, aged 73, died December 19 of cerebral hemorrhage.

Dr. Elwood Vaughan Hunt, Vienna, aged 53, was accidentally shot and killed December 27 near Ocean City.

Dr. George Leo Duane, Baltimore, aged 52, died December 31 at St. Agnes Hospital of mitral insufficiency following an operation for appendicitis and cholecystitis.

Dr. Samuel Allen Hardman, Baltimore, aged 39, died November 11 at St. Joseph Hospital of a skull fracture received when struck by an automobile.

MISSISSIPPI

The annual meeting of the Mississippi State Medical Association will be held in Vicksburg May 10-12.

Central Medical Society has elected Dr. E. H. Galloway, Jackson, President; Dr. R. W. Hall, Jackson, Secretary-Treasurer. Vice Presidents: Hinds County, Dr. C. R. Stingily, Jackson; Yazoo County, Dr. W. E. Noblin, Yazoo City; Rankin County, Dr. W. H. Watson, Brandon; Simpson County, Dr. A. E. Kennedy, Magee; Madison County, Dr. J. H. Howell, Canton.

Delta County Medical Society has elected Dr. Thomas F. Wilson, Arcola, President.

DeSoto County Medical Society has decided to retain its charter and not to unite with other counties to form a larger organization.

Harrison-Stone County Medical Society has elected Dr. J. C. Jones, Gulfport, President; Dr. A. F. Caraway, Gulfport, Vice-President, Harrison County; Dr. F. H. Robertson, Vice-President, Stone County; Dr. D. J. Williams, Gulfport, Secretary-Treasurer.

Issaquena-Sharkey-Warren Medical Society (newly consolidated) has elected Dr. Edley H. Jones, Vicksburg, President.

Panola County Medical Society is now affiliated with the North Mississippi Six County Medical Society, which is composed of the Counties of Benton, Lafayette, Marshall, Tippah, Union, Yalobusha and Panola. The Secretary is Dr. Ira B. Seale, Holly Springs.

Tate County Medical Society has elected Dr. Wm. Robert Gilbert, Tyre, President; Dr. W. D. Smith, Sanatobia, Vice-President; Dr. J. Sidney Eason, Coldwater, Secretary-Treasurer.

Tri-County Medical Society has elected Dr. Altus B. Harvey, Tylertown, President. The Society will apply for a new charter authorizing the entrance of Lawrence into the group.

Charity Hospital, Jackson, has reopened after being closed for several months. A new nurses' home has recently been completed.

Through the courtesy of the Board of Trustees of the Mississippi State Tuberculosis Sanatorium, a special invitation is issued to all practicing physicians of the State to come to the Sanatorium and take special training in diagnosis of diseases of the chest.

The Mississippi Tuberculosis Association, during last July and August, conducted its second annual health camp for children at Biloxi. The camp consisted of seven 16-foot pyramidal tents, a portable cottage and a kitchen, which were all screened against

(Continued on page 36)

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S.M.J.-4-27

(Continued from page 34)

mosquitoes. Children between seven and twelve years of age who were under weight and free from contagious diseases were eligible for admission. A physician was in charge. The per capita cost per child for maintenance was $50.88.

Mr. H. Mack Fulgham, an attorney of Jackson, has been employed by the State Board of Health as Field Deputy in the Bureau of Vital Statistics.

Miss Elizabeth Kimmons, Jackson, a graduate in oral hygiene of the Forsyth Dental Institute, Boston, Mass., has been employed by the State Board of Health as oral hygienist for work in the Laurel city schools.

Dr. D. S. Johnson, formerly acting in the capacity of Assistant to Dr. J. B. Black, Health Officer of Hinds County, has been assigned by the State Board of Health to the Sanatorium for a three months' intensive study of the diagnosis of tuberculosis preparatory to becoming full-time Health Officer of Greene County.

Miss Emily McQueen, Meridian, a graduate in oral hygiene of the Forsyth Dental Institute, Boston, Mass., has been employed as oral hygienist for the city schools of Meridian.

Deaths

Dr. T. K. Magee, Fernwood, was killed by a train on January 24.

Dr. Nolan Stewart, Jackson, aged 63, died December 18 at the U. S. Veterans Hospital 74, Gulfport, of chronic myocarditis and dilatation of the heart.

Dr. Frank I. Ketcham, Wenasago, aged 56, died November 30 of chronic nephritis.

Dr. Oliver B. Quin, McComb, aged 69, died January 19 of carcinoma of the throat.

MISSOURI

The annual meeting of the Missouri State Medical Association will be held in Sedalia May 2-5.

The second annual meeting of the Mississippi Valley Physical Therapy Association was held in St. Louis January 18-20. Dr. Ewerhardt was reelected President and Dr. Herbert Lund, Secretary.

At a recent meeting of the State Board of Health, Dr. William A. Clark, Jefferson City, was reelected President; Dr. Homer L. Kerr, Crane, Vice-President; Dr. James Stewart, Jefferson City, Secretary and State Health Commissioner.

The Missouri Methodist Hospital has elected the following officers: Dr. A. B. McGlothlan, President; Dr. Floyd Spencer, Vice-President; Dr. L. C. Bauman, reelected Secretary.

The Noyes Hospital, St. Joseph, at its annual staff meeting January 11, elected the following officers: Dr. H. J. Ravold, Chairman; Dr. J. F. Owens, Vice-Chairman; Dr. E. A. Gummig, Recorder; Dr. E. C. Ambrose, Secretary-Treasurer.

It is reported that an unusual number of persons in Kansas City are under treatment for possible rabies from dog bites. About 500 dogs have been vaccinated. Dr. Ernest W. Cavaness, Health Commissioner, is assisting in the preparation of an ordinance to be presented to the City Council to make the vaccination of dogs against rabies compulsory.

Jackson County Medical Society, Kansas City, held a symposium on pneumonia February 1.

St. Louis County Medical Society held a symposium on cardiac diseases February 1.

Dr. H. Delameter, Kansas City, has been elected Professor of Preventive Medicine at Junior College.

Dr. Robert E. Schwarz, Assistant Superintendent of the Robert Koch Hospital, St. Louis, succeeds Dr. Joseph J. Singer as Superintendent. Dr. Singer resigned.

Deaths

Dr. Walter Thomas Lemon, Fulton, aged 73, died February 2 of cholelithiasis.

Dr. August Herman Sante, St. Louis, aged 62, was shot and killed February 6.

Dr. Rollin Clinton Blackmer, St. Louis, aged 66, died December 25 of myocarditis and arteriosclerosis.

Dr. Samuel L. Hardinger, Civilbend, aged 71, died December 8 of cerebral hemorrhage.

Dr. Josiah Lee Horn, Dexter, aged 62, died January 2 of pneumonia.

Dr. Isaac F. Marquis, Cedar Springs, aged 77, died

(Continued on page 38)

Caution!

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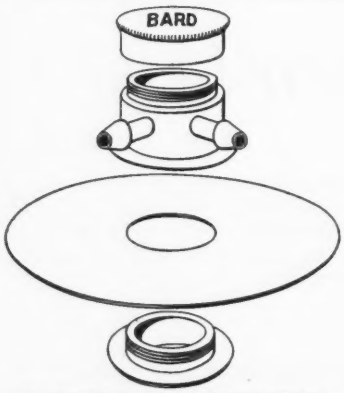

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NEW YORK CITY

(Continued from page 36)

February 2 at the home of his daughter in Fort Scott, Kansas, following a long illness.

Dr. Abraham Madison Underwood, Treloar, aged 55, died in December at St. Louis as the result of a cerebral hemorrhage.

Dr. Sarah Josephine Johnson Hitchcock, St. Louis, aged 84, died January 31 of heart disease.

NORTH CAROLINA

High Point-Thomasville Academy of Medicine was reorganized December 6. This organization has not functioned since the World War. Dr. Houston B. Hiatt, High Point, was elected President; Dr. Walter L. Jackson, Secretary.

The new children's building at the State Sanatorium for Tuberculosis will accommodate fifty patients.

Relatives of Dr. Edmund Strudwick, Hillsboro, have placed a portrait of Dr. Strudwick in the State Hospital for the Insane at Dix Hill, Raleigh. He was the first president of the Medical Society of North Carolina.

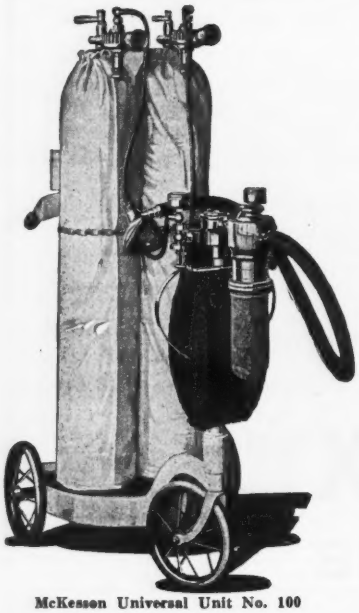
The Directors of the Edgecombe Hospital, Tarboro, have offered the hospital to the Counties of Edgecombe, Halifax and Martin to be held under a joint deed of trust to be used for the counties. If accepted, the hospital will be eligible to share in the benefits of the Duke Foundation. The indigent will receive free treatment. All legally licensed physicians of the counties are eligible to the staff.

White and colored physicians are cooperating in a movement for a new hospital for negroes which will soon be opened at Oxford. The hospital will be named the "Susie Cheatham Memorial Hospital" in honor of a daughter of H. P. Cheatham, who was Superintendent of the Oxford Colored Insane Asylum for several years.

Dr. Daniel G. Caldwell, Concord, succeeds Dr. Sidney E. Buchanan as Health Officer of Cabarrus County.

Dr. Thomas J. Summey, Brevard, was recently elected President of the local Kiwanis Club.

(Continued on page 40)



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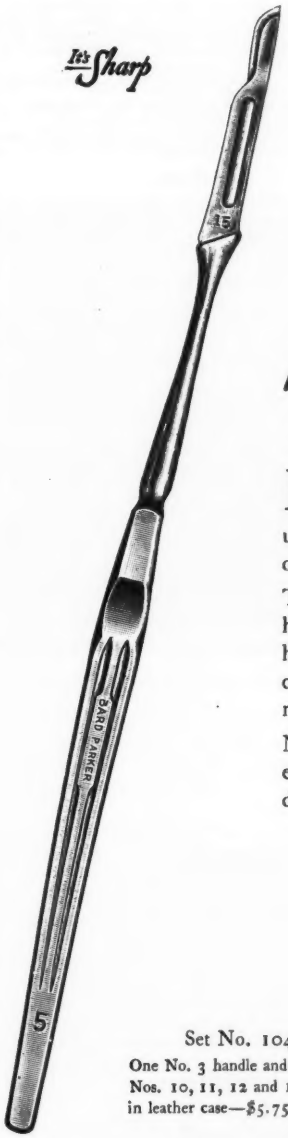

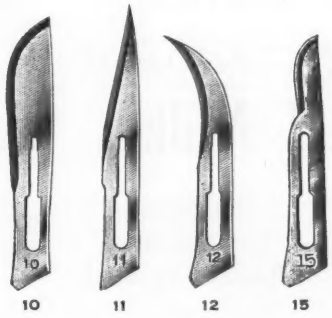

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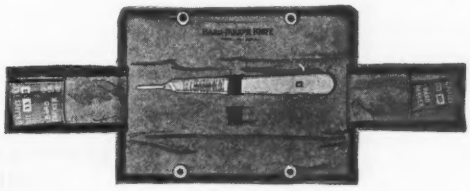

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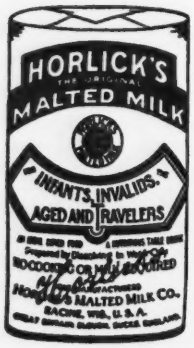

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(Continued from page 38)

In appreciation of his services as Secretary of the Wayne County Medical Society, Goldsboro, a silver pitcher has been presented to Dr. Albert G. Woodard.

Dr. Charles S. Lawrence, Winston-Salem, has been elected President of the North Carolina State Hospital Association.

Dr. Waite L. Lambert, Asheboro, was recently re-elected County Health Officer.

Dr. John H. Woodcock has been elected County Health Officer for Henderson County.

Dr. Joseph John Combs, Columbia, and Miss Isabella James Meekins, Elizabeth City, were married December 28.

Deaths

Dr. William Troy Harper, Southern Pines, aged 35, died January 8 at the U. S. Veterans Hospital No. 60, Oteen, of tuberculosis of the lungs, intestine and larynx.

OKLAHOMA

The annual meeting of the Oklahoma State Medical Association will be held in Muskogee May 4-6.

Atoka and Coal County Societies have consolidated and will be known as Atoka-Coal County Society. Dr. C. C. Gardner, Atoka, has been elected President; Dr. W. B. Wallace, Coalgate, Vice-President; Dr. Lemuel E. Gee, Stringtown, Secretary-Treasurer.

Beckham County Medical Society has elected Dr. H. K. Speed, Sayre, President; Dr. G. H. Stagmer, Erick, Secretary-Treasurer.

Bryan County Medical Society has elected Dr. Roy L. Cochran, Caddo, President; Drs. Albert S. Hagood and R. E. Sawyer, Vice-Presidents; Dr. B. B. Coker, Secretary-Treasurer.

Caddo County Medical Society has elected Dr. E. L. Inman, Apache, President; Dr. E. W. Hawkins, Carnegie, Vice-President; Dr. Chas. R. Home, Anadarko, Secretary-Treasurer.

Canadian County Medical Society has elected Dr. L. W. Wolfe, Okarche, President; Dr. W. P. Lawton, Vice-President; Dr. J. T. Riley, Secretary-Treasurer.

(Continued on page 42)

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SYNOL LIQUID SOAP
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(Continued from page 40)

Cleveland County Medical Society has elected Dr. W. T. Mayfield, President; Dr. T. J. Dodson, Vice-President; Dr. B. H. Cooley, Secretary-Treasurer.

Craig County Medical Society has elected Dr. F. T. Gastineau, Vinita, President; Drs. C. F. Walker, Grove, and C. P. Bell, Vinita, Vice-Presidents; Dr. Louis Bagby, Secretary-Treasurer.

Custer County Medical Society has elected Dr. C. H. McBurney, President; Dr. J. T. Frizzell, Vice-President; Dr. E. E. Darnell, Secretary-Treasurer.

Grady County Medical Society has elected Dr. E. L. Dawson, President; Drs. W. R. Barry and G. R. Gerard, Vice-Presidents; Dr. D. S. Downey, Secretary-Treasurer.

Greer County Medical Society has elected Dr. J. B. Lansden, Granite, President; Dr. W. O. Dodson, Willow, Vice-President; Dr. J. B. Hollis, Mangum, Secretary-Treasurer.

Jackson County Medical Society has elected Dr. Raymond H. Fox, Altus, President; Dr. Earl W. Mabry, Altus, Secretary.

Lincoln County Medical Society has elected Dr. W. H. Davis, President; Dr. J. W. Adams, Vice-President; Dr. J. M. Hancock, Secretary.

Marshall County Medical Society has elected Dr. O. E. Welborn, Kingston, President; Dr. T. A. Blaylock, Madill, Vice-President; Dr. W. D. Haynie, Kingston, Secretary-Treasurer.

Murray County Medical Society has elected Dr. J. T. Wharton, President; Dr. A. P. Brown, Vice-President; Dr. Howson C. Bailey, Sulphur, Secretary-Treasurer.

McLain County Medical Society has elected Dr. I. N. Kolb, Blanchard, President; Dr. W. C. McCurdy, Purcell, Vice-President; Dr. O. O. Dawson, Wayne, Secretary.

Okfuskee County Medical Society has elected Dr. C. M. Bloss, President; Dr. R. Keyes, Okemah, Secretary.

Okmulgee County Medical Society has elected Dr. J. P. Nelson, Shulter, President; Dr. L. B. Torrance, Vice-President; Dr. M. B. Glisman, Okmulgee, Secretary-Treasurer.

Payne County Medical Society has elected Dr. L. R. Wilhite, Perkins, President; Dr. W. B. Hudson, Yale, Vice-President; Dr. G. H. Gillen, Cushing, Secretary-Treasurer.

Pontotoc County Medical Society has elected Dr. M. C. McNew, President; Dr. W. M. Webster, Vice-President; Dr. C. F. Needham, Secretary-Treasurer.

Rogers County Medical Society has elected Dr. Caroline Bassman, President; Dr. Wm. P. Mills, Claremore, Vice-President; Dr. Walter A. Howard, Chelsea, Secretary-Treasurer.

Texas County Medical Society has elected Dr. Wm. H. Langston, President; Dr. R. B. Hayes, Guymon, Secretary.

Tulsa Academy of Medicine has been organized. The following officers were elected: Dr. Samuel Goodman, President; Dr. D. O. Smith, Vice-President; Dr. James Stevenson, Secretary-Treasurer. Board of Directors: Drs. Samuel Goodman, Fred A. Glass, D. O. Smith, James C. Braswell, James Stevenson.

Washita County Medical Society has elected Dr. A. M. Sherburne, President; Dr. B. W. Baker, Vice-President; Dr. A. H. Bungardt, Cordell, Secretary-Treasurer.

Woods County Medical Society has elected Dr. Elizabeth Grantham, President; Dr. Howard B. Ames, Vice-President; Dr. Oscar E. Templin, Alva, Secretary-Treasurer.

Woodward County Medical Society has elected Dr. T. C. Leachman, Woodward, President; Dr. H. Walker, Rosston, Vice-President; Dr. C. E. Williams, Woodward, Secretary-Treasurer.

The Oklahoma Society for Crippled Children recently held a two days' clinic at Muskogee, conducted by Drs. Wade H. Sisler, Tulsa, and William P. Fite, Muskogee.

Under the auspices of the Ardmore Rotary Club, Drs. Andrew G. Cowles, Ardmore, and Earl D. McBride, Oklahoma City, recently held a clinic for crippled children.

Dr. L. E. Emanuel, Chickasha, succeeds Mr. Paul Fesler as President of the Oklahoma Hospital Association.

Dr. Fred A. Glass was recently elected President of the staff of St. John's Hospital, Tulsa.

Dr. C. W. Hughes, Muskogee, for the past four years Assistant Medical Officer in Charge, U. S.

(Continued on page 44)

Competent Clinical Observers

agree that the tendency to acidosis in Influenza and Pneumonia is very high. Meet this by prescribing Kalak Water in sufficient amounts to keep the urine always neutral.

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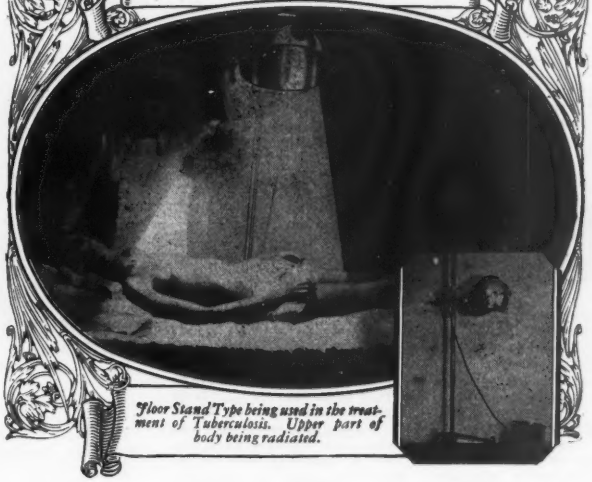

"Floor Stand" Type being used in the treatment of Tuberculosis. Upper part of body being radiated.

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CHICAGO

(Continued from page 42)

Veterans Hospital, has been transferred to St. Paul, where he will have a similar position.

Dr. J. M. Bonham, Hobart, was recently elected President of the Hobart Country Club.

Deaths

Dr. Howard Weber, Bartlesville, aged 64, died January 29 of myocarditis.

Dr. Samuel N. Myers, Helena, aged 63, died November 2 of pneumonia.

Dr. John A. Sterrett, McAlester, aged 78, died in December.

Dr. John Charles Mahr, Oklahoma City, aged 59, died January 16 of cerebral hemorrhage.

Dr. George Wesley Lackey, Oklahoma City, aged 85, died January 20 of pneumonia.

Dr. Gibson Andrew Dillon, Muskogee, aged 77, died December 17 at Tulsa.

Dr. Charles Edward Bacon, Davidson, aged 48, died December 19 at Frederick of hemorrhage of the stomach.

Dr. George Russell Gordon, Wagoner, aged 67, died November 1 of carcinoma of the kidney.

Dr. Eben N. Allen, McAlester, aged 72, died January 5 after a prolonged illness.

Dr. William S. Woodford, Douthat, aged 51, died January 7 as a result of injuries received in an automobile accident.

Dr. W. D. Phillips, Maud, died January 19.

SOUTH CAROLINA

Hampton County Medical Society has been reorganized. Dr. Marion L. Peeples, Jr., Garrett, is Secretary.

The counties of Lexington, Edgefield and Saluda have arranged for a tri-county society. Dr. W. P. Timmerman is President.

Oconee County Medical Society has elected Dr. J. S. Stribling, President; Dr. W. C. Marett, Vice-President; Dr. E. A. Hines, Secretary-Treasurer.

South Carolina Pediatric Society met in Columbia

(Continued on page 46)

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Frequently relieves obstinate dropsy in Cardiorenal Disease, Nephroses, Cirrhosis of the Liver, Banti's Disease, etc. Return of dropsy may be prevented by occasional administration.

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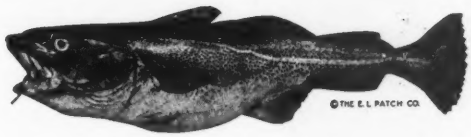

It is now quite the common practice among physicians to prescribe cod liver oil for all babies as a protective measure against rickets or malnutrition.

As it is advisable to start with a very small dose, it is important to know that the oil employed is of definitely known vitamin potency. Only a cod liver oil of guaranteed vitamin potency, which has been biologically tested can be depended upon to give the desired protection.

In the manufacture of PATCH'S FLAVORED COD LIVER OIL, every step of the process is carefully controlled, insuring an oil which is very potent and pleasant to the taste. Each lot of oil produced in our plants is biologically tested for your protection.

If you can prescribe a small dose of pleasant tasting oil, that's half the battle. Your patients, young and old, will appreciate such a product.

Let us send you a sample so that you may taste it and be convinced.

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931 N. Alabama St. INDIANAPOLIS

(Continued from page 44)

in January. Dr. Wm. E. Simpson, Rock Hill, is President; Dr. M. W. Beach, Charleston, Vice-President; Dr. T. D. Dotterer, Columbia, Secretary-Treasurer.

York County Medical Society has elected Dr. Roy D. Sumner, Rock Hill, President; Dr. J. B. Elliott, Fort Mill, Vice-President; Dr. W. C. Whitesides, York, Secretary-Treasurer.

Dr. Robert Wilson, Charleston, has been elected President of the Tri-State Medical Association for the Carolinas and Virginia.

Deaths

Dr. Eugene Henry Ackerman, Cottageville, aged 38, died December 23 of carcinoma.

Dr. E. Mikell Whaley, Little Edisto, aged 55, died December 27 at the Columbia Hospital, Columbia.

Dr. Homer H. Burroughs, Conway, aged 52, died recently of cerebral hemorrhage.

Dr. Sebron Leroy Parnell, Lamar, aged 45, died January 20.

TENNESSEE

Coffee County Medical Society has elected Dr. J. H. Farrar, Manchester, President; Dr. E. L. Womack, Summitville, Vice-President; Dr. U. B. Bowden, Pelham, Secretary.

The Tri-County Medical Society (Carroll, Benton, Henry and Weakley Counties) has elected Dr. E. A. Travis, Como, President; Drs. W. P. McGill, Camden, E. M. Everett, McKenzie, and T. W. Fields, Dresden, Vice-Presidents; Dr. R. M. Little, Martin, Secretary-Treasurer.

The three-story, forty-bed building for the care of tuberculosis patients, erected at a cost of approximately $40,000, was formally opened at Pine Breeze, January 1. Funds for this building were donated by the Masons of Chattanooga and Hamilton County.

The hospital under construction at Murfreesboro is the recipient of a gift of $10,000 from Samuel H. Hodge, Chicago, to erect a nurses' home.

Dr. Lunsford D. Fricks, U. S. Public Health Serv-

(Continued on page 48)

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(Continued from page 46)

ice, whose headquarters have been at Memphis for several years, was recently detailed head of the Sixth District, which includes Washington, Oregon, California, Utah, Idaho and part of Montana, with headquarters at Seattle. Major J. A. LePrince will succeed Dr. Fricks at Memphis.

Dr. Jerome L. Morgan was recently elected President of the Memphis Urological Society.

Dr. Mayne B. McCrary, Woodbury, is the new President of the Stone River Academy of Medicine, Murfreesboro.

Dr. John Overton has been appointed Health Officer of Nashville to succeed the late Dr. William E. Hibbett.

Dr. George R. Livermore has been elected President of the Memphis and Shelby County Medical Society.

Dr. John B. McNulty and Miss Eliza Catherine Myers, both of Memphis, were married January 17.

Deaths

Dr. John Thomas Altman, Sr., Nashville, aged 62, died in December of heart disease.

Dr. Isaac Newton Hyde, Nashville, aged 61, died February 1 at a local hospital of septicemia.

Dr. William Trousdale Allen, Gallatin, aged 73, died December 29.

Dr. William E. Hibbett, Nashville, aged 57, died January 18 of chronic myocarditis.

Dr. John William Brandau, Clarksville, aged 69, died November 23.

Dr. John Ballard S. Martin, Cookeville, aged 78, died recently of heart disease.

Dr. Harrington Marr, Nashville, aged 52, died December 14 of angina pectoris.

Dr. William D. Abernathy, Pulaski, aged 72, died January 7 of paralysis.

Dr. Charles Edward Jackson, Capleville, aged 82, died January 6 of senility.

Dr. Isaac N. Black, Linden, aged 83, died December 19 at Sugar Hill of senility.

Dr. Joseph Henry Liebkemann, Memphis, aged 72, died January 5 following a long illness.

Dr. J. Hugh Carter, Memphis, aged 46, died Feb-

(Continued on page 50)

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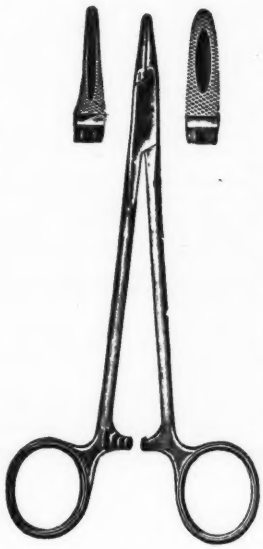

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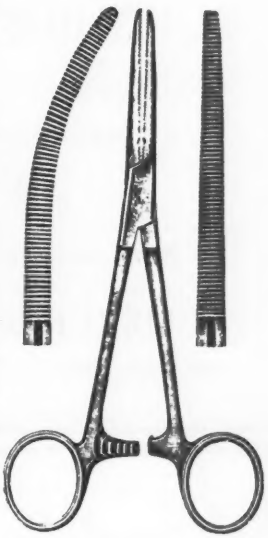

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F547RS—Mayo Pean Forceps, 6½" curved Box Lock, each $3.75

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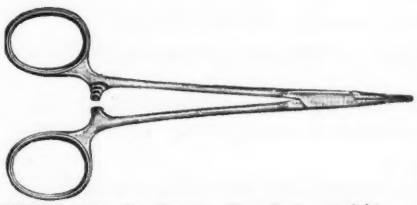
F507RS—Mayo Ochsner Forceps, 6¼" straight Box Lock, each 3.75



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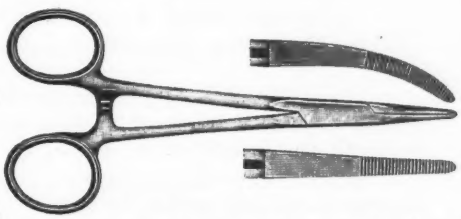
F288RS—Mosquito Forceps, Box Lock curved, each 3.20

F335RS—Kelly Forceps, straight, flat shank, each 2.00



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(Continued from page 48)

ruary 7 at a local hospital of myocarditis.

Dr. Walter B. Carter, Bartlett, aged 57, died February 12 at a hospital in Memphis, of peritonitis.

Dr. Clarence Humphrey Davis, Nashville, aged 38, died December 16 at a local hospital of bronchopneumonia.

Dr. Wm. C. McDonald, Soddy, aged 70, died October 30.

TEXAS

The North Texas Medical Association will meet in Paris June 14-15.

The Tri-State Medical Association (Texas, Arkansas and Louisiana) recently met in Texarkana, Texas. Dr. Spencer A. Collom, Texarkana, was elected President; Dr. John A. Hendrick, Shreveport, Vice-President. The next meeting will be held at Shreveport, La.

Coleman County Medical Society has elected Dr. J. M. Nichols, Coleman, President; Dr. F. M. Burke, Coleman, Secretary.

DeWitt County Medical Society has elected Dr. B. J. Nowierski, Yorktown, President; Dr. G. M. Duckworth, Cuero, Vice-President; Dr. J. W. Hale, Yoakum, Secretary-Treasurer.

Gonzales County Medical Society has elected Dr. N. A. Elder, President; Dr. George Holmes, Vice-President; Dr. W. T. Dawe, Secretary-Treasurer.

Jasper-Newton Counties Medical Society has elected Dr. T. R. Ogden, President; Dr. A. J. Richardson, Secretary-Treasurer.

McCullouch County Medical Society has elected Dr. J. L. Hutchinson, Mason, President, reelected; Dr. P. A. Baze, Lohn, Vice-President; Dr. J. A. Anderson, Brady, Secretary, reelected.

Navarro County Medical Society has elected Dr. E. P. Norwood, Corsicana, President; Dr. Wm. K. Logsdon, Corsicana, Vice-President; Dr. Dan B. Hamil, Corsicana, Secretary-Treasurer.

Nueces County Medical Auxiliary was organized January 21. Mrs. A. H. Speer was elected President;

(Continued on page 52)

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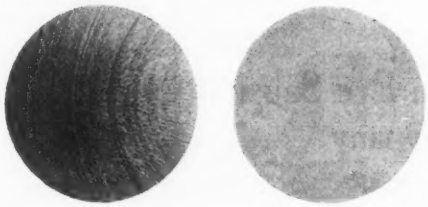

Left: *Scarred surface of an ordinary lens.*

Right: *Tillyer lens surface.*

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Louisville, Kentucky.

(Continued from page 50)

Mrs. Edgar Mathis, Vice-President; Mrs. J. H. Hansen, Secretary; Mrs. W. H. Cooley, Treasurer.

Contract has been let for a new hospital building in Mercedes. Dr. D. L. Heidrick is erecting the building.

According to a recent announcement of Dr. J. H. Groseclose, Superintendent of the 125-bed Dallas Sanitarium, Dallas, the sanitarium will open May 1.

Amarillo is planning a Medical Arts Building at a cost of $800,000 or more.

According to the report of the sanitary engineering division to the State Health Officer, during the last two years fourteen water purification plants have been constructed in the State.

Dr. Abell D. Hardin was recently elected President of the Baylor University Medical Alumni.

Dr. James C. Anderson, Plainview, has been appointed State Health Officer to succeed Dr. Harry O. Sappington, Galveston.

Dr. Benjamin T. Bryant, Tyler, has been reappointed County Health Officer.

Dr. William Hale, Dallas, has been reappointed County Health Officer.

Dr. Robert L. Knolle, Seguin, has been appointed County Health Officer.

Dr. Cornelius Oliver Bailey and Mrs. Sue Preddy Baugh, both of Dallas, were married February 5.

Deaths

Dr. Edward Henry Schwab, Yoakum, aged 55, died January 22 of heart disease.

Dr. Emmett Camp Flanagan, DeBerry, aged 67, died December 25 of influenza.

Dr. Archie Maurice Spurgin, Dallas, aged 48, died in December.

Dr. Peter Cyrill Balde-Sarelli, San Antonio, aged 58, died January 11.

Dr. Ballard Alvin Dinwiddie, Clarksville, aged 73, died January 12.

Dr. John French Bell, Oakwood, aged 55, died December 29 of heart disease.

Dr. W. C. Murray, Walnut Springs, aged 57, died

(Continued on page 54)

The Management of an Infant's Diet

Mellin's Food—A Milk Modifier

Constipation

It is common observance among physicians who use Mellin's Food as a modifier of milk for infant feeding that their baby patients are seldom troubled with constipation, and if this annoying symptom does occasionally appear it is easily corrected by increasing the amount of Mellin's Food in the daily mixture or by some other slight readjustment of the formula.

Some fault in the arrangement of the food formula is practically always the cause of constipation, so it seems logical to overcome the difficulty by rearranging the food elements to a more perfect balance rather than to employ medical means, which at best afford temporary relief only.

In a pamphlet entitled, "Constipation in Infancy", the common causes of constipation are set forth for the physician's consideration, also practical suggestions for their correction. All of the matter presented is based upon observation extending over a long period and will prove of good service to every physician interested in the subject.

A copy of the pamphlet will be sent promptly upon request. Samples of Mellin's Food also if desired.

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Surgical Instruments and
Hospital Supplies

Laboratory Apparatus

I. L. LYONS & CO., Ltd.
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NEW ORLEANS

(Continued from page 52)

December 14 of acute neprhitis and dilatation of the heart.

Dr. Jake T. Wilhite, Austin, aged 50, died recently of pneumonia.

Dr. John H. Hannabass, Gail, aged 56, died January 22 of paralysis.

Dr. Alfred Randolph Craven, Waco, aged 73, died January 5 of angina pectoris.

Dr. C. W. Goddard, Austin, died March 14.

VIRGINIA

Albemarle County Medical Society has elected Dr. I. A. Bigger, University, President; Dr. H. L. Baptist, Ivy Depot, Vice-President; Dr. F. C. McCue, Charlottesville, reelected Secretary-Treasurer.

Dinwiddie County Medical Society has elected Dr. E. W. Young, Petersburg, President; Dr. D. C. Mayes, Church Road, Vice-President; Dr. W. C. Powell, Petersburg, reelected Secretary-Treasurer.

Nansemond County Medical Society has elected Dr. William T. Gay, Suffolk, President; Dr. G. Richardson Joyner, Suffolk, Vice-President; Dr. C. F. Moriarty, reelected Secretary-Treasurer.

Pittsylvania-Danville Medical Society has elected Dr. Charles A. Easley, Chatham, President; Dr. L. E. Fuller, Axton, Vice-President; Dr. John A. Hawkins, Danville, Secretary-Treasurer.

Warwick County Medical Society has elected Dr. J. E. Marable, President; Dr. W. W. Falkener, Vice-President; Dr. Waverly R. Payne, Secretary-Treasurer.

The Woman's Auxiliary to the Richmond Academy of Medicine has elected Mrs. Francis W. Upshur, Chairman; Mrs. J. W. Hannabass, Secretary-Treasurer; Mrs. Stuart Michaux, General Social Chairman; Mrs. T. N. Ennett, Vice-Chairman of Social Activities.

The American College of Surgeons held its sectional meeting for Maryland, District of Columbia, Virginia and West Virginia in Washington, D. C., January 17-18. Dr. Hugh Trout, Roanoke, was elected Chairman of the Virginia Section; Dr. Julian L. Rawls, Norfolk. Secretary; Dr. Joseph T. Buxton, Newport News, Councilor. The next meeting will be held in Roanoke.

Post-Graduate Instruction in Eye, Ear, Nose and Throat, Bronchoscopy and Esophagoscopy was given at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, March 15-19.

The college authorities of the Medical College of Virginia have been authorized by the Executive Committee of the Board of Visitors to prepare a twenty-year building program preliminary to construction of three new buildings projected for the immediate future, including a laboratory for chemistry, bacteriology and pathology, a new clinic for the walking sick, and a woman's dormitory.

The Roanoke Hospital, Roanoke, recently announced an anonymous gift of funds for the immediate erec-

(Continued on page 56)

CLASSIFIED ADVERTISEMENTS

LABORATORY TECHNICIANS AVAILABLE—We have several well trained practical laboratory technicians graduating from our school of public health May 15; physicians, hospitals and health departments desiring such service can secure it by writing immediately; first come, first served. Address Dr. L. H. South, State Bacteriologist, 532 West Main Street, Louisville, Ky.

BECAUSE OF ILLNESS I am compelled to sell my home and give up my practice. Will introduce my patients to purchaser. G. F. W., care Journal.

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usually leads to a prompt return of the baby's weight to normal.

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Weight Chart and Feeding Records will gladly be mailed to the physician upon request.

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(Continued from page 54)

tion of a three-story home for nurses to be built adjoining the old nurses' home.

Memorial services were held at the Medical College of Virginia, Richmond, January 7, honoring the late Dr. John W. Brodnax, who was a member of the Department of Anatomy for thirty-three years.

Dr. Hugh S. Cumming, Surgeon General, United States Public Health Service, will be the commencement speaker at the Medical College of Virginia, Richmond, May 31. Dr. Cumming is an alumnus in medicine both of the University of Virginia and the Medical College of Virginia.

Dr. William B. Porter sailed on March 3 for Europe, where he will spend several months visiting medical centers preliminary to his assuming the full-time professorship of medicine at the Medical College of Virginia, Richmond.

Dr. H. A. Spitler, Middleburg, has been elected Vice-President of the Board of Directors of the Middleburg National Bank.

Dr. L. F. Hansbrough, Front Royal, has been elected a member of the Board of Directors of the Bank of Warren.

Dr. Robert Sory, U. S. Public Health Service, is in charge of the Trachoma Hospital, recently opened at Richmond.

Dr. L. M. Allen, Winchester, has been elected one of the directors of the Clarke County Horse and Colt Show Association.

Dr. S. E. Oglesby, Lynchburg, has been appointed City Physician. He succeeds Dr. Powell G. Dillard, resigned.

Dr. R. B. Ware, Amherst, has been elected a member of the Board of Directors of the Bank of Amherst.

Dr. L. S. Early, Petersburg, has been elected a director of the Union Trust and Mortgage Company.

Dr. Fred J. Wampler has been appointed to take charge of the Accomack County Health Unit, succeeding Dr. Robert P. Cooke, resigned.

Dr. D. L. Elder has been reelected a member of the Board of Directors of the Hopewell Chamber of Commerce.

Dr. Garnett Nelson, Richmond, has been reelected President of the Richmond Tuberculosis Association.

Dr. Horace G. Longaker has resigned as Assistant City Health Officer of Newport News.

Dr. W. W. Wilkinson, LaCrosse, has been reelected one of the directors of the Bank of LaCrosse.

Deaths

Dr. Fred M. Hisey, Edinburg, aged 71, died December 29 of chronic myocarditis.

Dr. Alvin Davies Lamberth, Newport News, aged 27, died January 24 of heart disease.

Dr. Okey R. Davis, Bluefield, aged 47, died in January.

Dr. F. L. Campbell, Jeffersonton, aged 61, died January 26 of dilatation of the heart.

Dr. John T. B. Hyslop, Belle Haven, aged 62, died January 7 at a hospital in Norfolk.

Dr. Walter Cox, Winchester, aged 54, died January 16 of cerebral hemorrhage.

Dr. Thomas Clinton Firebaugh, Harrisonburg, aged 57, died January 12 of pneumonia.

(Continued on page 58)

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Aids in reducing the purulent secretion.
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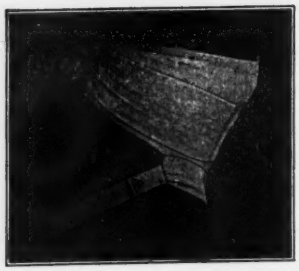

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(Continued from page 56)

WEST VIRGINIA

The annual meeting of the West Virginia State Medical Association will be held in White Sulphur Springs June 21-23.

The Central Tri-State Medical Society (West Virginia, Kentucky and Ohio) will hold its second annual meeting at Huntington April 28.

Preston County Medical Society has elected Dr. W. A. Welton, Terra Alta, President; Dr. R. D. Harmon, Kingwood, Vice-President; Dr. L. H. Lewis, Kingwood, Secretary-Treasurer.

Fayette County Medical Society, at a meeting in January, voted to favor the establishment of a tuberculosis sanatorium in Southern West Virginia.

The West Virginia State Medical Association at its last meeting voted unanimously that a treasurer of the Association should not succeed himself more than five terms.

The Ohio Valley Hospital, Wheeling, plans to erect a $200,000 nurses' home which is expected to be completed by January, 1928.

Dr. David Littlejohn has been appointed Director of the Division of Rural Sanitation of the State Health Department. Dr. Littlejohn succeeds Dr. J. G. Townsend, of the U. S. Public Health Service, who has been transferred to the Pacific Coast.

Deaths

Dr. John B. Watson, Jr., St. Marys, aged 64, died November 28 of heart disease.

Dr. Michael Siebert Butler, Hedgesville, aged 72, died recently at Baltimore, Md., of carcinoma of the stomach.

Dr. A. Null Osborne, Frum, aged 39, died January 20 of pneumonia.

Dr. Edward J. McGovern, Shinnston, aged 41, died January 19 of pneumonia.

Dr. John P. Davisson, Janelew, aged 73, died January 18 of pneumonia.

Dr. Thaddeus Clayton McClung, Rupert, aged 56, died August 24 of tumor of the left lung.

Dr. Hampden Aulick Burke, aged 40, died in Shepherdstown after a brief illness of pneumonia.

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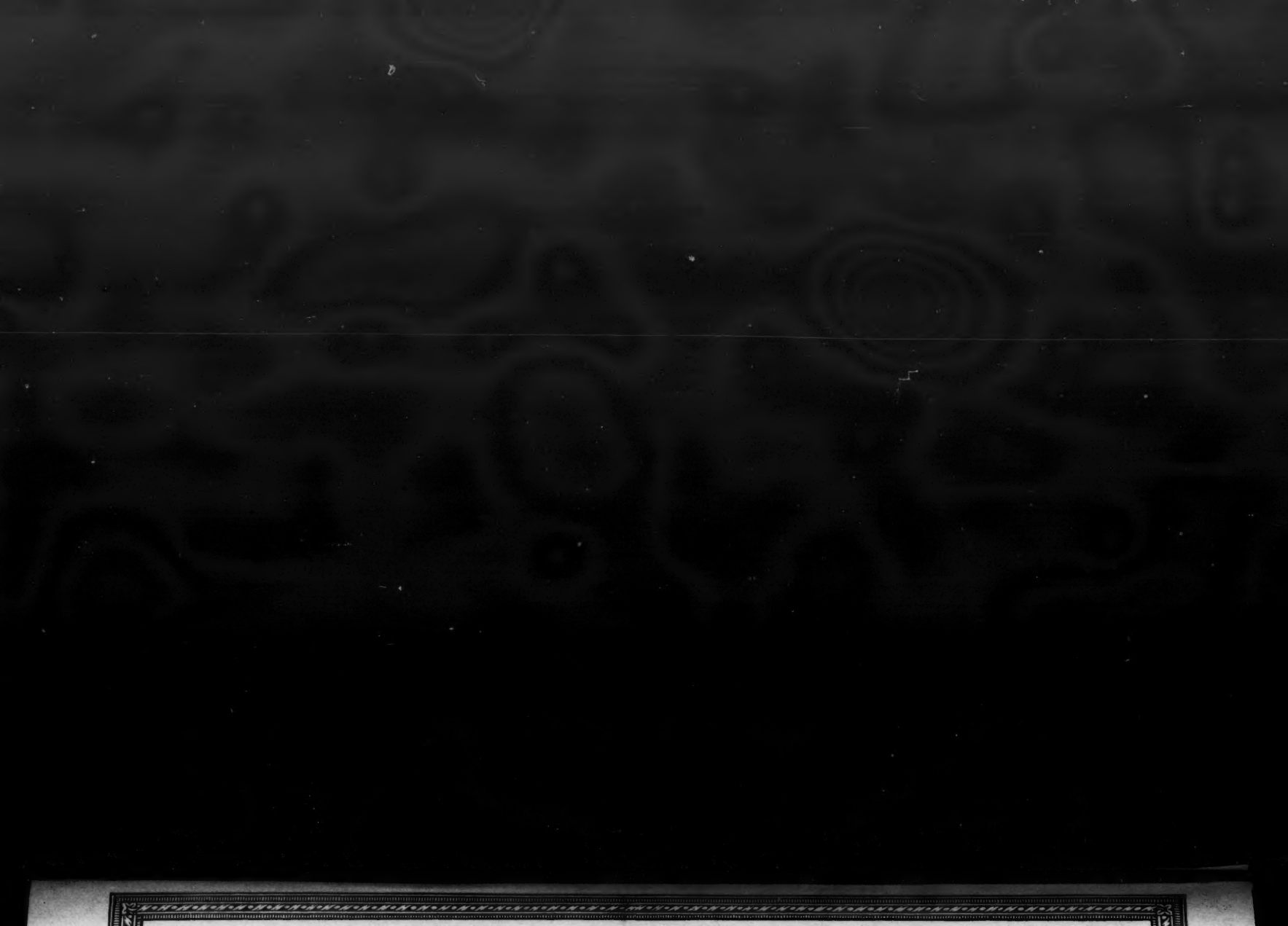
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